

# East County Area Plan

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*Draft*  
February, 1993

**Volume 2**  
**Background Reports**  
**- Setting, Trends and Issues -**

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**Volume 2**  
**Background Reports**  
**- Setting, Trends and Issues -**

**Alameda County Planning Department**  
399 Elmhurst Street  
Hayward, California 94544  
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# INTRODUCTION

## ■ OVERVIEW

Early in the process of the County's General Plan review program, County Planning Department staff prepared and circulated five issue papers to stimulate discussion and invite community input on several broad planning issues related to the East County planning area. These issue papers identified major trends and pressures in the planning area, examined changing conditions, and summarized policy directions and planning techniques available to address the identified issues. Following the conclusion of a series of public hearings on the issue papers, staff initiated preparation of detailed reports which together form a "master environmental assessment," a comprehensive inventory of existing conditions (physical and regulatory) in the East County planning area. Through text and graphics, each report presents a detailed setting description, followed by the identification of historical and emerging trends and an analysis of planning issues. A list of information sources can be found at the end of each report. These reports have been compiled into this document: *Background Reports - Setting, Trends and Issues*, Volume 2 of the *East County Area Plan*.

Policies of the *East County Area Plan* (see *Volume 1*) were formulated to address key issues raised in these background reports. In its entirety, this document provides readers with a "roadmap" which communicates the thinking process behind policies and programs of the plan. Since the background reports serve as the underpinnings of the *East County Area Plan*, they should be reviewed alongside the policy document to enable a clear understanding of the basis for and overall direction of the plan.

## ■ REGIONAL SETTING OF EAST COUNTY

The East County (formerly called the Livermore-Amador Valley Planning Unit) encompasses 418 square miles of eastern Alameda County and includes the cities of Dublin, Livermore, Pleasanton, and a portion of Hayward as well as surrounding unincorporated areas. The planning area extends from the Pleasanton/Dublin ridgeline on the west to the San Joaquin County line on the east and from the Contra Costa County line on the north to the Santa Clara County line on the south. The East County is part of the Tri-Valley subregion which includes incorporated and unincorporated areas of Contra Costa County including Danville, San Ramon, Blackhawk/Alamo and Dougherty and Tassajara Valleys. Figure 1 shows the planning area's boundaries and its location in the region.

The East County planning area has been divided into 11 geographic subareas to orient the reader and facilitate discussion of general geographical areas (refer to Figure 2). These subareas are: West Dublin, East Dublin/Doolan Canyon, North Livermore Valley, Altamont Hills, Mountain House, South Livermore Valley, South Ridgeland, South Pleasanton, Quarry, Pleasanton Ridgeland, and Sunol Valley. Other than for purposes of orientation and discussion, the subareas have no planning significance.





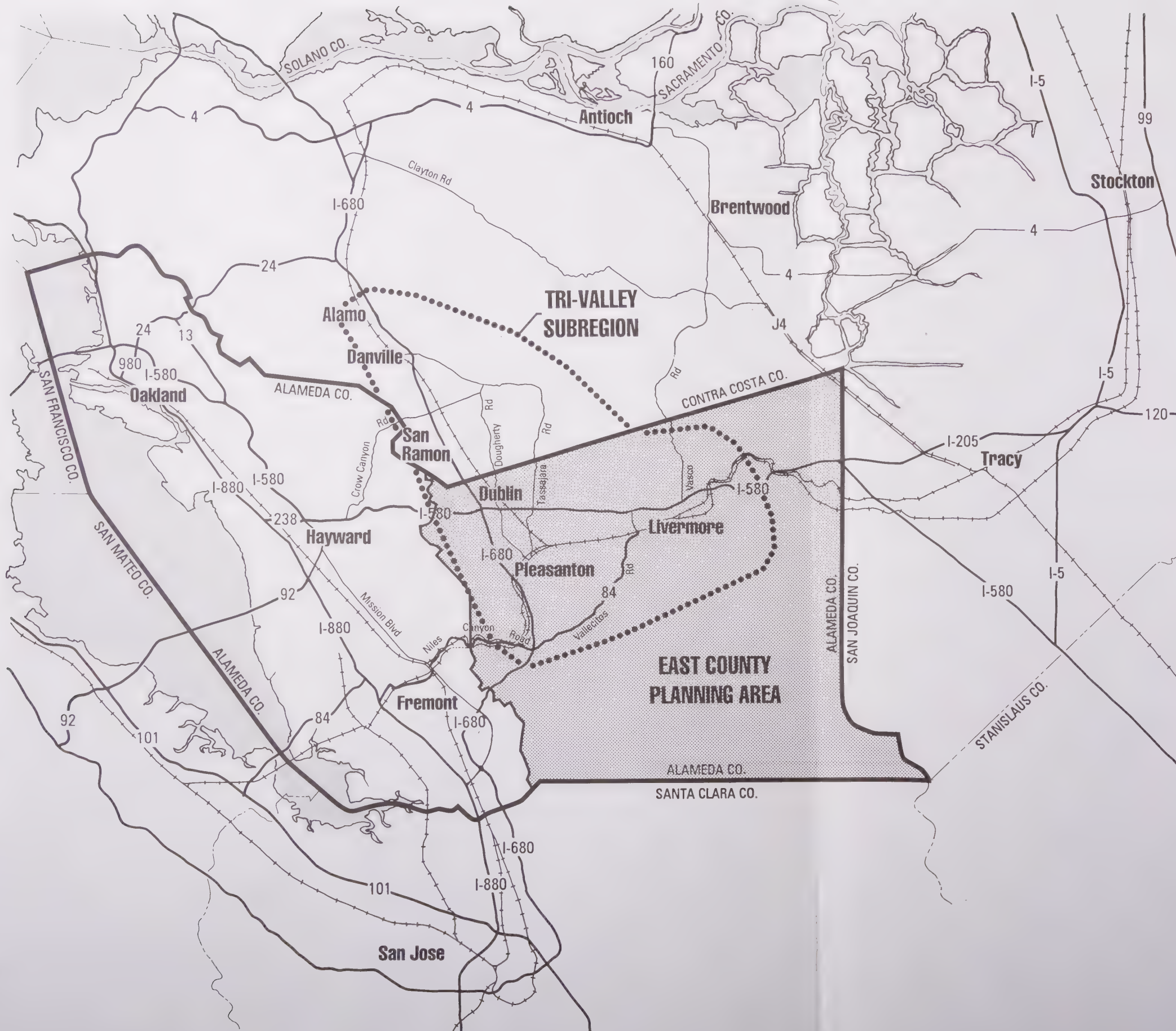
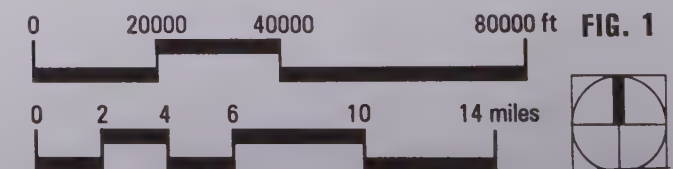
## Regional Setting

### LEGEND

 East County Planning Area



SOURCE: Alameda County Planning Department





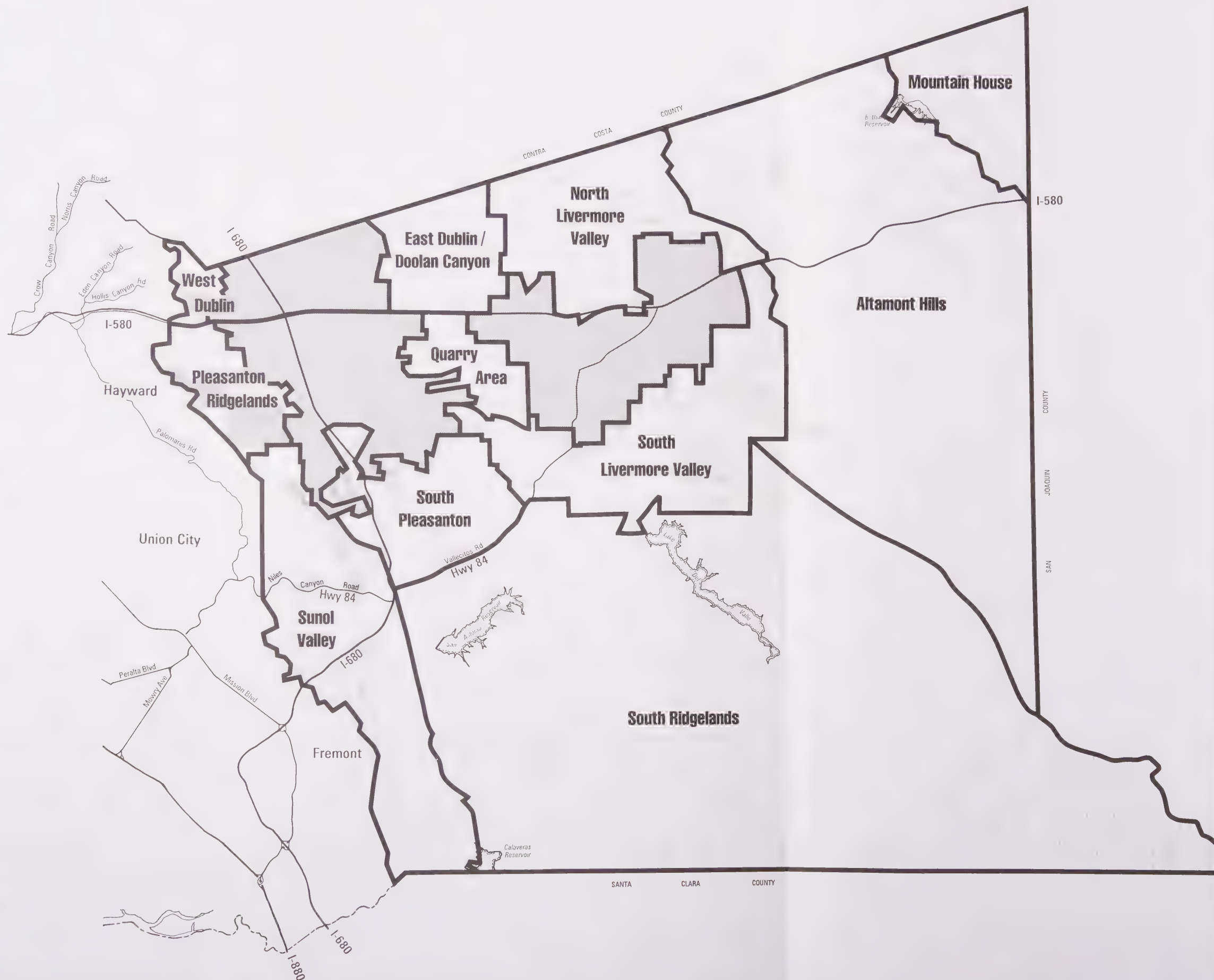


# Geographic Subareas

## LEGEND

 Incorporated Cities

**NOTE:** Subareas are based primarily on physical characteristics and correspond with setting descriptions in the background reports. Subareas may differ from GPA study areas.



SOURCE: Alameda County Planning Department

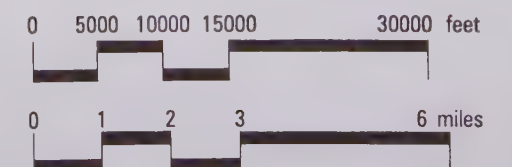


FIG. 2













## Urban Land Use

### ■ INTRODUCTION

The following report discusses urban land uses in the East County. The urbanized portion of the East County is located within the Livermore-Amador Valley, home to the planning area's three incorporated cities of Dublin, Livermore and Pleasanton. Since the 1960s, urbanization has proceeded at a rapid pace as indicated in the brief history of urban development below:

- Before 1920, development in the East County was based upon a local agricultural economy that was effectively isolated from Bay Area urban centers.
- After 1920, the automobile and an improved road system resulted in the integration of this area with the region, although growth remained slow and predominantly dependent on local agriculture.
- The 1950s saw an essential change in the East County as nuclear research facilities (Lawrence Livermore Laboratory, Sandia Laboratories, and General Electric Vallecitos Nuclear Center) came to dominate the economy.
- During the 1960s and early 1970s, the widening of Route 50 (now I-580) to expressway standards, and the completion of I-680 significantly improved access to the East County from other urban employment centers in the Bay Area resulting in (combined with other social and economic factors) very strong demand for housing, especially suburban density, single-family detached.
- During the 1980s, the East County became an employment center with new jobs in financial services and technology, with Hacienda Business Park in Pleasanton a major employer.
- In the 30-year period between 1960 and 1990, the extent of the urban areas in the East County expanded fifteen-fold, from less than 2,000 acres in 1960, to 5,700 acres in 1970, to 10,100 acres in 1980, and to 31,000 acres in 1990.

See the *Cultural Resources* background report in Section E for a more detailed account of the history of the East County.

## ■ EXISTING CONDITIONS

### Development in Incorporated Areas

Most urban development in the East County is located within the planning area's three incorporated cities: Pleasanton, Dublin, and Livermore. Together, the three cities represent about 97 percent of the East County's 1990 population of 133,154 (ABAG Projections 92). As required by state law, each city must prepare a comprehensive general plan for its planning area. (The most recent general plan updates for Pleasanton, Dublin, and Livermore were adopted in 1986, 1985, and 1976 respectively.) A city's planning area encompasses its incorporated territory as well as the city's sphere of influence (SOI), an area adopted by the Local Agency Formation Commission (LAFCO) which defines the city's probable ultimate physical boundaries and service area and which usually extends into surrounding unincorporated areas. A city's planning area may also include territory beyond the "sphere of influence" which the city deems to bear a relation to its local planning concerns. Before a city may annex land adjacent to its boundaries, that land must be within its SOI as set by LAFCO. If a city wishes to annex land outside of its SOI, the city must request that LAFCO amend the sphere to include the area to be annexed. The purpose of a sphere of influence is to encourage "planned, well-ordered, efficient urban development patterns, the preservation of open space lands, and the discouragement of urban sprawl (California Government Code, Section 56000." (Refer to Appendix 1 for further information on the role of LAFCO). Figure 3 shows existing city limit and sphere of influence boundaries in the planning area.

A number of General Plan Amendments (GPAs) are currently being considered by the cities of Dublin and Livermore for land in their respective extended planning areas. Areas of proposed annexation are shown on Figure 4 and associated proposed land uses are summarized in Table A-1 below.

Characteristics of Incorporated Development. Urban development within the cities of Dublin, Pleasanton and Livermore is characterized by relatively low residential densities. In 1980, the average residential density in incorporated areas was about 4.6 units per gross acre. Under existing general plans and general plan amendments, average residential density will not change significantly. The amount of currently vacant and underutilized land within incorporated areas varies considerably by city. Under the cities' existing general plans, Dublin has virtually no infill land for residential development, while Pleasanton and Livermore together can accommodate about 14,000 additional housing units. Much of the currently underutilized land is zoned for commercial and industrial uses, of which only somewhat more than 30 percent is needed to accommodate projected future demand (ABAG Projections '92).



TABLE A-1				
Proposed City General Plan Amendments				
Project	Housing Units	Commercial/Industrial (Sq. Ft.)	Land Area <sup>1</sup> (Acres)	Status
Eastern Dublin	15,000	13,000,000	7,000	Proposed
Western Dublin	3,130	100,000	3,250	Approved by City Council (7/13/92)
North Livermore <sup>2</sup>	2,700 to 16,500	5,150,000 to 7,700,000	15,000	Proposed
Totals:	20,830 to 34,630	18,250,000 to 20,800,000	25,250	
<b>Note:</b> <sup>1</sup> Approximate planning area, including open space within the planning area.  <sup>2</sup> Four land use alternatives are being considered by the City of Livermore, ranging in population from 10,000 to 45,000.  <b>Source:</b> Alameda County Planning Department				

### Development in Unincorporated Areas

Although grazing and other agricultural uses predominate in the unincorporated areas surrounding the developed portions of Livermore-Amador Valley, there are a number of residential enclaves, commercial enterprises, and public and private facilities scattered throughout this portion of the planning area. (If residential enclaves do not receive water and sewer service, they are considered rural residential and are discussed elsewhere in this section under the *Non-Urban Land Use and Open Space* background report.)

Residential and Commercial. There are two areas of suburban density residential land use in the unincorporated area: the Castlewood Country Club and Foothill Road areas south and west of Pleasanton. Residential densities here are greater than one unit per acre. The Castlewood Country Club area is a residential development on the east side of Pleasanton Ridge surrounding the country club golf courses. Low suburban density residential development extends south along Foothill Road. These areas receive water, sewer, and fire protection from the City of Pleasanton through a County Service Area.

There is virtually no commercial development in the unincorporated area. There is a small locally-oriented commercial district in Sunol and limited highway-oriented commercial

development at several of the interchanges along I-580 and I-680. There are some wholesale nurseries, particularly south of Sunol and a recreational vehicle storage facility on Tesla Road. There are a limited number of construction companies and wrecking yards on the eastern outskirts of the City of Livermore. There is a large area planned and zoned for commercial and industrial use between Livermore and Pleasanton, but which is as yet undeveloped.

There are several producing wineries in the unincorporated area south of the City of Livermore. These range from fairly small to large, and process grapes grown in the valley and imported from other areas. In conjunction with wine production, they also variously involve wine tasting and sales and sale of associated products. One winery also includes a restaurant and meeting facility.

Public and Private Facilities. There are three major research laboratories in the unincorporated area: the Lawrence Livermore Laboratory and the Sandia Laboratories are located just east of Livermore and the General Electric Vallecitos Nuclear Center facility is located northeast of Sunol. The Santa Rita County Jail facility is located in Dublin, and the federal government maintains the Pleasanton Correctional Institution and Camp Parks in this same vicinity. The Del Valle Sanitarium and U.S. Veterans Administration Hospital are located on Vallecitos Road south of Pleasanton. (These facilities are discussed in the *Major Public Facilities and Utilities* background report in Section D.)

### Subareas

North Livermore, Western Dublin, and Eastern Dublin. Proposed city general plan amendments for these subareas are listed on Table A-1.

South Livermore Valley. Alameda County has recently prepared a draft plan (*Revised South Livermore Valley Area Plan*, February 6, 1992) to guide land use decisions within approximately 15,500 acres of currently unincorporated lands south and east of the City of Livermore and south and west of the City of Pleasanton. The draft plan creates no new entitlements for additional development; instead it establishes a set of criteria for judging development proposals in the area covered by the plan. In general, these criteria seek to limit urban development to locations that will minimize impacts on agricultural areas and to projects that will further the plan's objective in preserving and enhancing viticulture and other cultivated agriculture. Features of the plan include the formation of a land trust and the use of agricultural easements to permanently protect productive lands. Rural residences, wineries, and bed & breakfast establishments could also occur under the plan. Environmental review for the plan is underway. Upon certification of the EIR, the Alameda County Board of Supervisors will consider adoption of the plan policies as an amendment to the Livermore-Amador Valley Planning Unit (now the East County) of the Alameda County General Plan.

The cities of Livermore and Pleasanton are being encouraged by the County to adopt relevant policies of this plan as amendments to their respective General Plans and to initiate annexations and/or expansion of their respective spheres-of-influence to include areas of future urban development. Pleasanton proposes to add to its sphere and annex a 1,500-acre area including the County-approved Ruby Hill development (850 homes) and the Vineyard Avenue corridor



west of Isabel Avenue and Vallecitos; Livermore proposes to add to its sphere and annex a 1,200-acre area east of Isabel Avenue and Vallecitos.

[For more information, see the *South Livermore Valley Area Plan Draft Environmental Impact Report*, June 1992.]

#### Sunol Valley (Vargas Plateau and Sheridan Road)

The City of Fremont's General Plan (adopted 1991) contains policies regarding Fremont's potential expansion into unincorporated land located in the Sunol Valley Subarea. The city has identified the Vargas Plateau and Sheridan Road (on and/or east of the ridgeline and northwest and southeast of I-680 respectively) within its planning area. Fremont General Plan policies call for a planning study to be undertaken that will evaluate the advisability of incorporating this land into the city and permitting development. (The areas would first have to be added to the city's sphere of influence). If the study finds the extension of services and development in portions of these areas to be appropriate, the General Plan calls for a second planning effort to develop a specific plan for the area identified for development.

A similar study will be prepared by both Fremont and Union City to assess the development potential of the Niles Hills area.

#### **Surrounding Land Use**

Contra Costa and San Joaquin counties, adjacent to the planning area to the north and east respectively, form part of the regional context of the East County planning area by virtue of shared wildlife habitats, a common transportation network, and intertwined socio-economic dynamics associated with the larger Bay Area. Both counties have recently updated their general plans; Contra Costa County has established an Urban Limit Line which would preclude development along the common boundary with the East County except for the San Ramon Valley and the Dougherty and Tassajara Valleys, where general plan amendments for residential development are being pursued. The proposal for a new community in San Joaquin County immediately adjacent to the East County on the east side of Altamont Pass north of I-580 (Mountain House GPA) was recently rejected by the county's Board of Supervisors but project proponents are seeking an amendment to the adopted 2010 general plan (July 29, 1992). A number of other projects are also under consideration in this area of San Joaquin County. The locations of these projects are shown in Figure 5; Table A-2 summarizes the land use programs.

TABLE A-2

**Major Land Use Proposals in the East County Vicinity**

<b>Project</b>	<b>Housing Units</b>	<b>Commercial/ Office</b>	<b>Planning Area (Acres)</b>	<b>Status</b>
<b>Dougherty Valley</b>	Up to 11,000	Up to 800,000 Square Feet	6,000	Proposed Specific Plan
<b>Tassajara Valley</b>	5,340	52 Acres	6,000	Proposed General Plan Amendment
<b>Mountain House</b>	16,000	700 acres	4,700	Proposed General Plan Amendment
<b>Source:</b> Alameda County Planning Department				

## ■ TRENDS

### Increase in Subregional Planning Activities

The 1990s are likely to witness an increase in subregional or regional planning activities. Some of these activities will be in response to state mandates requiring such planning in order to reduce air pollution and traffic congestion problems. The Tri-Valley Transportation Council is a joint powers authority created to address transportation issues in the Tri-Valley area of Alameda and Contra Costa Counties. The Council has synthesized existing and proposed land uses as part of a transportation modeling effort. The process used by the Council to collect and review land use information among the jurisdictions in the Tri-Valley appears to be leading the way to a mutually agreeable holding capacity target for the Tri-Valley and the East County. Tri-Valley cities have agreed to use ABAG Projections for jobs and housing to the year 2010 as the common holding capacity for the Tri-Valley area. (Holding capacity is the ultimate size of an area that can be accommodated if all land uses shown on the General Plan maps were to be built and is expressed in terms of population and housing units, square footage and jobs at buildout.) In its response to the Bay Vision 2020 Regional Planning Proposal, the Tri-Valley Transportation Council has also proposed interjurisdictional coordination of growth boundaries, facilities, services, and infrastructure. A coordinated holding capacity target would be a prerequisite to these types of subregional planning efforts.



Other locally-initiated subregional planning activities include the Tri-Valley Affordable Housing Committee and the Tri-Valley Wastewater Authority aimed, respectively, at providing affordable housing at a subregional level and planning and building a new system to treat and carry wastewater in excess of present pipeline capacity. (See Appendix 3 for further information on subregional planning efforts.)

At the state level, the California Growth Management Consensus Project identified "strong support" among its diverse members for regional performance standards to hold all levels of government responsible for meeting statewide growth management goals. Regional and subregional holding capacity targets would appear to be a cornerstone of such performance standards in that quantifiable targets are required to plan for housing, open space, transportation, infrastructure, and other public facilities and services.

### **Rapid Expansion of Urban Development**

Since 1980, the extent of urban development in the East County (as measured by land within existing city limits) has increased by 300 percent, from 10,100 acres in 1980 to the current 31,000 acres. Figure 6 shows urban expansion in the valley during the past decade (including potential expansion under the cities' existing spheres-of-influence) in terms of the total amount of developable, or relatively flat, land remaining. The East County planning area will continue to see rapid expansion of urban development across the floor of the Livermore-Amador Valley and into the surrounding hills as communities expand in response to growth and economic pressures. Virtually the entire valley floor and a good portion of the adjacent hill area has been or is being considered for development and eventual annexation. (See Figure 4, which shows the planning areas for current city general plan amendment proposals.) The as-yet-undeveloped extended planning areas of the three cities (totalling about 52,000 acres) approach twice the amount of land within the cities' existing aggregated incorporated area (about 31,000 acres).

### **Uncertainty Regarding East County Growth**

Among the greatest uncertainties surrounding urban land use in the East County in the 1990s is the magnitude and timing of development--due mainly to transportation limitations, potential sewage export capacity constraints, and the limited existing water supply. A number of ways are being examined to overcome the existing export capacity and water supply constraints (refer to the *Wastewater* and *Water Supply* background reports in Section D.)

### **Traffic Constraints at Altamont Pass**

The effect on the East County's transportation system from major land use proposals in San Joaquin County (as shown on Figure 5) will be limited by capacity constraints on Interstate-580 going over Altamont Pass; i.e., once the capacity threshold is reached, given all feasible improvements, additional growth in San Joaquin County will not further affect traffic conditions in the planning area.

### **Increased Concern for the Efficient and Cost-Effective Provision of Infrastructure and Services**

The provision of adequate infrastructure (e.g., roads, sewers, sewage treatment capacity) and public facilities (e.g., schools, libraries, police and fire stations, parks) is placing an increased burden on local government budgets. While capital costs of expanding capacity to serve new development can often be covered by fees levied on new construction, the cost of maintenance and reconstruction must be funded from other revenue sources. These concerns have led the cities of Livermore and Pleasanton to implement growth management policies that either phase growth or limit growth to the ability of the community to provide the necessary services at established level of service standards.

### **Intensification of Urban Land Uses and Increased Attention to Urban Quality of Life Concerns**

A review of recent large-scale development proposals in the planning area indicates a trend toward higher intensity urban forms. The cities of Pleasanton and Livermore have been rezoning some excess commercial and industrial land for high density residential use. The North Livermore (45,000 population alternative) and East Dublin proposals are examples of major new development projects which promote compact development and thus minimize conversion of open space.

Another consequence of increasing intensification of urban land uses is likely to be increased attention to the necessities and amenities needed to maintain and enhance quality of life within higher density urban areas. This is likely to include a wide variety of issues, such as:

- provision of a variety of housing types including affordable housing and housing for special needs groups (e.g., seniors and disabled);
- provision of basic facilities (e.g., grocery stores and day care centers) near new areas of higher density residential development;
- increased attention to urban design to provide a safe and attractive urban environment for pedestrians;
- development or redevelopment of urban parks and recreation areas to make them more attractive, usable, and safe, particularly for senior citizens and families with children;
- provision of cultural and entertainment facilities convenient to higher density residential areas;
- adequate police patrolling to provide safety and security, both day and night, for residents and visitors; and,
- improvements in public transit to and from urban centers.

These urban design and level of service standards have found increasing support from citizens, local governments, and developers as environmental and economic resources have become more limited.



### **Increased Polarization Regarding High Density Infill Development**

At the same time that the East County's economy and population have been growing during the last decade and economic and public policy pressures have been pushing toward higher densities of development, a countervailing pressure has also been developing--that of increased neighborhood opposition to higher densities in infill areas, particularly in or near established single-family neighborhoods. Infill land consists of vacant or underutilized parcels that are already served by utilities and are surrounded by urban development. Urban infill has been the subject of much interest on the part of both the public and private sectors in recent years because it promises at least a partial solution to urban sprawl. Nevertheless, neighborhood objections to infill development can make it difficult for local government to proceed with infill projects.

## **■ PLANNING ISSUES**

### **Subregional Land Use Planning**

Currently, each of the three cities, the County, and numerous special service districts formulate separate plans for future growth, conservation, public services, and the quality of life for their constituents independent of neighboring agencies. This situation often leads to inefficiencies in land use patterns, the delivery of services, and the regulation of market economies. As Figures 4 and 6 dramatically illustrate, virtually all of the flatter and therefore more developable areas as well as more constrained areas of the Livermore-Amador Valley are now being planned for by local jurisdictions. In its update of the General Plan for the East County, the County has an opportunity to take a lead role in coordinating growth in the planning area. If the present opportunity for subregional cooperation and land use coordination is missed, the quality of life of all residents may be jeopardized. Establishing a mutually agreed upon holding capacity for the East County, using a common database for planned land uses, would be a first step in land use coordination.

### **Location of Future Development**

Growth projected for the East County needs to be accommodated in ways which minimize environmental and quality-of-life impacts and maximize the efficient provision of infrastructure and services. Future development in the East County, therefore, generally should be concentrated in areas which:

- 1) are closer to employment centers rather than further away;
- 2) are relatively flat rather than hilly;
- 3) have direct access to freeways and transit stations;
- 4) are adjacent to existing communities; and,
- 5) have few biological, public safety, and resource constraints.



Areas which meet these locational criteria are the relatively flat lands north of I-580 east of Dublin and north of the City of Livermore. Compact development in these areas could accommodate growth while minimizing impacts.

### **The Question of Infill**

Opportunities and constraints of infill development are discussed in *Urban Infill: Its Potential as a Development Strategy* by the U.S. Department of Housing and Urban Development, January 1982 and *Infill Development Study* by Southwest Land Research, Inc. for the Planning Department of the City of Albuquerque, March 1988. Often-cited advantages to infill focus on:

- making full use of in-place infrastructure to reduce the costs of continuous outward extensions of public services;
- saving energy by reducing average commuting times and increasing public transit ridership;
- preserving agricultural and environmentally sensitive land at the urban fringe;
- strengthening the tax base in established central cities and suburbs;
- limiting total development costs to keep down new housing prices; and
- targeting more development toward preservation and enhancement of established neighborhoods.

In many instances, however, the benefits of infill are tempered by the following considerations:

- aging physical infrastructure is often prohibitively expensive to upgrade;
- the cost of infill land is frequently high in relation to the sale or lease value or the finished project;
- land assembly can be difficult or impossible;
- risk and uncertainty in gaining approvals severely restricts the number of applicants from the private and public sectors (the up-front costs to gain approvals on small or medium infill sites are significantly greater on a per lot basis than those at the urban edge);
- construction costs are higher compared to the economies of scale achievable with large-scale urban fringe development;
- not all vacant land within existing urban areas may be suitable or available for building; supply may be limited by physical constraints such as irregular topography or size or poor drainage, location problems in marketability, and the unwillingness of some owners to make their land available for development (in a case study analyzing residential infill land supply in three counties, only 25 percent of vacant land was found suitable for development); and
- neighborhood protest to infill development can make it difficult for local government to proceed with infill projects.

As a consequence of opposition to policies which promote higher residential densities in infill areas located in single-family neighborhoods, consideration should be given to promoting infill. Locations which should particularly be considered for infill include:

- areas where higher density housing already exists;
- areas predominantly surrounded by or at the edges of commercial and industrial land uses; and
- areas where achieving other public policy objectives (e.g. encouraging and facilitating public transit usage by increasing the density of development around transit stations) may override neighborhood opposition.

The Urban Land Use Institute's Council on Development Choices believes that greater compactness of development can be achieved through selective increases in density while retaining the character and attractiveness of single-family neighborhoods. Compatibility of the infill project with surrounding structures can often be achieved through sensitive design solutions such as similar building facades and setbacks.

#### **Mechanism to Monitor Density of New Development**

The monitoring of densities for new development within areas designated for urbanization will be necessary in order to attain compact development standards. The Bay Area Council recently conducted in-depth surveys of proposed and approved residential projects in Alameda and Contra Costa Counties. Preliminary results of their analysis reveal that many higher density residential projects have been approved below the mid-point density allowed by local General Plans and have resulted in planned holding capacities not being met. This finding suggests that a mechanism will be needed to monitor the density of each phase of new development so that desired overall densities can be maintained.

#### **Urban Development Design and Performance Standards**

Urban design and performance standards will need to be adopted to guide new urban development. The following list is a bibliography of urban design guidelines prepared by local environmental, design and land use professionals:

- Greenbelt Alliance, Guidelines for Endorsement of Compact Housing Development, May 20, 1991.
- Calthorpe Associates in association with Mintier & Associates, Transit-Oriented Development Design Guidelines (prepared for Sacramento County Planning & Community Development Department) November 1990.
- National Transit Land Use Center, University of California at Berkeley, Transit-Based Cluster Housing Symposium, June 18, 1992. (NTRAC is dedicated to the development and redevelopment of America's rail transit stations as sites for new transit-based communities.)

- Urban Land Institute, Developing New Communities, 1992.
- Urban Land Institute, Density By Design, 1988.

## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Promotion of subregional planning for the East County*
- *Establishment of a holding capacity or other limit which would address projected housing and employment growth in the East County*
- *Accommodation of new growth in North Livermore and Eastern Dublin*
- *Provision of efficient and cost-effective community services and infrastructure*
- *Provision of community amenities, guided by urban design and level of service standards, for each phase of new development*
- *Support of infill development where appropriate (in areas where higher density housing already exists, in areas predominantly surrounded by or at the edges of commercial and industrial land uses, and in areas which achieve other public policy objectives)*
- *Promotion of compact development*
- *Monitoring densities of new projects in order to achieve compact development*



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Bay Vision 2020 Committee, Review Draft Report, January 1991.

Center for California Studies, Summary of Findings--Growth Management Consensus Project, January 5, 1992.

City of Dublin General Plan, 1985 (as amended to January 1992).

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City of Pleasanton, General Plan, 1986 (as amended to January 1992).

City of Livermore, General Plan, 1976 (as amended to November 1988).

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San Joaquin Countywide General Plan (adopted July 1992)

San Joaquin County, Mountain House New Town General Plan Amendment DEIR prepared by Baseline Environmental Consulting, December 1991.

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Tri-Valley Transportation Council, Managing Growth in the Bay Area, February 25, 1992.



## **Non-Urban Land Use and Open Space**

### **■ INTRODUCTION**

The vast majority of land in the East County is unincorporated and consists of extensive hills which frame the rapidly urbanizing Livermore-Amador Valley. Non-urbanized land uses within this area are rural residential, agriculture (mostly grazing with some irrigated cultivation in South Livermore Valley and Mountain House), publicly-owned regional parks and watershed lands, and special natural resource land uses such as sand and gravel quarries and windfarms (see Figure 7). These non-urbanized lands, when added to environmentally sensitive lands (i.e., critical habitat and sensitive viewsheds) and lands constrained by potentially hazardous conditions (i.e., steep topography, landslide, flood and fault zones), comprise the East County's regionally significant open space, or those lands which have an open and natural character and are of sufficiently large scale to have significance on the regional level. For the most part, these components of the East County's open space are discussed in other background reports.

### **■ EXISTING CONDITIONS**

#### **Rural Residential**

There are several areas of very low density residential development (generally on parcels of between one and five acres) scattered throughout the unincorporated East County (see Figure 7). These areas are found along Buena Vista Avenue, Wentz Street, Marina Avenue, Bess Avenue, and other streets south of the City of Livermore; along Foothill Road between the City of Pleasanton and Sunol; and along the three miles of Kilkare Road north of Sunol. The town of Sunol, with a population of about 500, is a small rural residential community at the eastern end of Niles Canyon. Except for Sunol, these areas do not receive public sewer or water service; instead, individual residences rely on septic systems and wells. Limited agriculture or agriculture-related activities may occur on some of these parcels.

#### **Agriculture**

Development on agricultural parcels typically consists of one single-family dwelling and uses accessory to the agricultural operation on the parcel. These accessory uses include farm buildings, such as barns, stables, corrals, and coops; buildings for packing products raised on the premises; and stands for the sale of products raised on the premises. Existing zoning regulations allow, as a conditional use, additional dwellings for persons employed in the agricultural use of the subject property and their families, and/or living quarters for farm laborers. Non-agricultural uses that are compatible with agriculture, such as wineries, recreational facilities, public utilities, sanitary landfills and wind turbines for generating electricity, can also be found in the agricultural area.



There are relatively few very small parcels in agricultural areas. However, there are clusters of parcels under 40 acres, subdivided prior to current zoning. The largest concentration is along Tesla Road. Smaller groupings can be found north and south of I-580 near the San Joaquin County border (Midway Road), along Mines Road, east of Calaveras Road near the Santa Clara County border (Welch Creek), northeast of the intersection of Vallecitos Road and I-680 (Little Valley), along Doolan Canyon Road, along Collier Canyon Road, and generally scattered throughout the area north of the City of Livermore (Dyer Road and north of May School Road on Bel Roma Road). This information is summarized in Figure 7.

Large-parcel agriculture is the predominant land use in the unincorporated portion of the East County. According to the 1987 Census of Agriculture, the size of the average farm in Alameda County is 349 acres. A wide variety of agricultural activities take place in this area, including grazing, viticulture, dryland farming, and irrigated agriculture. A detailed discussion of agricultural uses is included in the *Agriculture* background report in Section A.

## **Public Lands**

Regional Parks. The East Bay Regional Park District owns or manages nearly 20,000 acres of regional park land in the East County and several additions to the park system are under consideration (see Figure 21). Refer to the *Parks and Recreation* background report in Section D for additional information.

Watershed Lands. The San Francisco Water Department (SFWD) owns approximately 67,900 acres of watershed land in the East County and adjacent Santa Clara County (about half of this acreage overlaps with the Sunol and Ohlone Regional Parks). The 40,000 acres of watershed located in the East County comprises much of Sunol Valley and surrounds the San Antonio Reservoir south of Vallecitos Road and Calaveras Reservoir on the Santa Clara County line (see Figure 22). These lands were acquired between 1870 and 1900 and since 1930 have been fenced to prevent trespass. Although some of the land is grazed under permit, the watershed lands have generally retained high biological resource quality.

To comply with federal regulations, SFWD is considering construction of a new water treatment plant in Sunol Valley. The plant would include seven miles of pipeline, a 3,500-horsepower pumping station, an 80-million gallon treated water reservoir, a new operations building, and 10 acres of additional "lagoons". SFWD has also recently initiated two planning efforts for its watershed land in the East County, the Alameda Creek Water Resources Study (discussed below under "Quarries") and the Alameda Watershed Management Plan. The Watershed Management Plan will focus on the following issues: resolving land use incompatibilities arising from development of adjacent lands; maintaining water quality; and, examining multiple-use opportunities, especially passive recreation, on watershed land. SFWD will continue to pursue conjunctive uses with the East Bay Regional Park District.

Small areas of water management land under State ownership in the East County include the Bethany Reservoir and the South Bay Aqueduct corridor.

### Special Natural Resource Land Uses

Quarries. Major sand and gravel resources are located along the arroyos of the Livermore-Amador and Sunol Valleys (see Figure 7). Hard rock is found in the Apperson Ridge area. The State Mining and Geology Board, in a January 1987 report incorporated into the California Administrative Code, designated over 5,800 acres in the planning area as "Regionally Significant Construction Aggregate Resource Areas." These areas include 3,128 acres between Pleasanton and Livermore, 494 acres along Arroyo del Valle southwest of Livermore, 629 acres along Arroyo Mocho southeast of Livermore, 990 acres in the Sunol Valley, and 600 acres on Apperson Ridge. Surface Mining Permits have been granted to govern the extraction of these resources as well as reclamation of the sites.

The San Francisco Water Department owns, as part of its watershed lands, a large portion of the aggregate resource land in Sunol Valley. As noted above, SFWD is in the process of conducting a study on the portion of Alameda Creek that runs from the Calaveras Reservoir through Sunol Valley. The study will examine the feasibility of water releases in that segment of Alameda Creek for development of a trout fishery. The study will also look at the quarries on land leased from SFWD and as yet undeveloped aggregate resource lands in Sunol Valley in order to make recommendations for new permits and continued leasing. Until impacts of existing and potential quarries can be determined, SFWD has initiated a moratorium on new leases and has requested that the County withhold consideration of new Surface Mining Permit applications.

In 1981, the County adopted the *Specific Plan for Livermore-Amador Valley Quarry Area Reclamation* for a 3,820 acre area between Pleasanton and Livermore. The Specific Plan contains a coordinated reclamation plan for all of the quarry area with final reclamation for the entire area anticipated to occur by 2030. Over the 40-year period that sand and gravel reserves are expected to last in the quarry area, the pit areas are to be shaped into a "chain-of-lakes" which will provide a surface water storage and conveyance system that will be dedicated to and operated by the Alameda County Flood Control and Water Conservation District Zone 7. Currently, there is no master reclamation plan for the quarry area in Sunol Valley.

Windfarms. There are extensive wind turbine fields in the area north and south of the Altamont Pass near the boundary with San Joaquin County (see Figure 7). The Altamont Pass area, designated by the California Energy Commission as the Altamont Pass Wind Resource Area, straddles both Alameda and Contra Costa Counties. It is the most developed wind resource area in the world with approximately 7,000 wind turbines (of which over 5,800 are within Alameda County) producing 1,100 million kilowatt hours of electricity annually for distribution by Pacific Gas and Electric (PG&E). This annual energy output is enough to supply the electrical need of all residences in a city the size of Oakland (350,000 people). Of the 103 conditional use permits for wind farming approved by the County, 75 are currently active. The County's windfarms are spread over approximately 78 square miles, but the turbines and ancillary electric power lines, access roadways, and maintenance facilities occupy a relatively small proportion of the total land area (ten percent or less, typically, for each permit). The remainder of the land continues to be used for agricultural production (dry grain farming and cattle grazing), or as open space.



If the full development potential of the Altamont Pass area was utilized, another 3,000 turbines could go into operation. Future development could be limited by the presence of residences or other uses, such as reservoir and landfill. Actual development would depend on detailed wind measurement, land lease negotiation, environmental constraints, and the financial feasibility of development, including powerline capacity and payment contracts.

Landfills. The 2,170-acre Altamont Sanitary landfill site (which includes the 225-acre fill area and the 1,020-acre expansion area) and the 644-acre Vasco Road landfill (which includes the 226-acre fill area and the 86-acre expansion area), located in the northeastern quadrant of the East County, handle most of the County's solid waste. See the *Solid and Hazardous Waste Management* background report in Section D for additional information.

### **Other Open Space**

Environmentally Sensitive Lands. Environmentally sensitive lands are comprised of critical biological habitat, unique natural features, and important viewsheds, ridgelines and community buffers which establish the open space character of a place. Usually, these areas are vulnerable to relatively minor levels of disturbance. For those areas which are not already included in the public domain (e.g., parks, watershed lands, and preserves), protection of these areas is usually achieved by environmental regulation and local government policies. For additional information, refer to the *Biological Resources* and *Visual Resources* background reports in Section E.

Hazard Zones. Hazard zones are land areas which, if developed, could jeopardize the public health, safety and welfare. Hazardous zones include flood prone areas and geologically unstable areas (e.g., landslide areas, seismically vulnerable areas, and areas of steep topography). Development is usually controlled or precluded in such hazard zones by state and local regulations and policies. Refer to the background reports in Section F.

Remote Areas. Many remote areas in the East County are constrained to development due to lack of access and relative absence of services (e.g., water, sewer, police, fire, schools, and other community amenities) and thus contribute to the planning area's open space.

## **■ TRENDS**

### **Increased Interest in Open Space Preservation**

Public interest in open space preservation will grow through the 1990s as urban and rural growth pressures affect open space lands. The perceived value of open space to the public is increasing as undeveloped lands are converted to urban use, as outdoor recreational needs increase with population, and as the environmental value of natural habitats are recognized. Preservation methods most likely will focus on land acquisition, conservation easements, strict land use regulations, clustering of development, and requiring significant open space dedications as a condition for development approval. The effectiveness of efforts to preserve open space through public purchase, however, may be reduced by the rapidly rising costs of land within the County.



Many jurisdictions in California have employed an urban growth boundary, (also known as an urban limit line) to define a greenbelt and protect open space. By surrounding an urban area, the urban growth boundary defines where the urban area stops and open space, used for community buffers, agriculture, recreation or other activities and visual amenities consistent with open space, begins. (Refer to Appendix 2, *Techniques for Growth Management*, for additional information on this planning technique.)

An example of a recent local initiative to help establish an urban growth boundary for the Bay Area was that proposed by the Bay Vision Action Coalition (whose members include Greenbelt Alliance and other environmentally-concerned groups) as amendments (April 13, 1992) to state regional planning legislation (SB 797). The Coalition's criteria for the establishment of urban growth boundaries are summarized below:

- 1) Developable lands within urban growth boundaries shall provide feasible opportunities to meet no more or less than twenty year projections of growth at average minimum densities consistent with the regional compact growth goal.
- 2) Lands designated for urban development shall not include lands protected by state or federal statute, including wetlands and habitat required for species listed under state or federal law as threatened or endangered, public park or open space lands secured by conservation easements, or lands designated in adopted public agency master plans as future parklands or public open space.
- 3) Other lands to be conserved as open space include prime and unique agricultural land, other land critical to the long-term maintenance of regional or subregional agricultural economics, major ridgelines, hill faces and other lands necessary to protect important viewsheds, buffers between communities, habitat areas and migration corridors essential for long-term biodiversity, streams and riparian zones, and lands that are hazardous to develop.
- 4) All remaining land outside of the urban growth boundary shall be conserved as a regional greenbelt.

Although the legislation was not successful, these criteria represent one approach to open space protection.

### **Increased "Rurbanization" of Agriculture**

There is a strong real estate market for small agricultural parcels. They provide an opportunity for non-farm families attracted to an agricultural lifestyle and environment; retired farmers or ranchers who want to maintain a smaller-scale operation; persons who wish to keep horses and have riding trails nearby; and persons who wish to have a part-time or "hobby" farm or ranch operation. In addition, certain high-value, high-intensity commercial agricultural operations can be conducted on such parcels.

Unfortunately, small agricultural parcels appear to have serious negative impacts on commercial agriculture. U.C. Davis Agricultural Economist Warren Johnston refers to "rurbanization"

caused by rural homesites, ranchettes and small farms. He finds that small parcels tend to remove the most productive farmland from commercial use. According to Prof. Johnston:

The most distinctive characteristic of rural development are the intermixture of farm and rural-residence land uses with no sharply defined boundaries for either; demand by dispersed, residential users for urban-type services not needed by farmers; and the imposition of additional costs of mixed development on farmers. Urbanization and ruralization have increased at the expense of agricultural systems. They directly compete with agriculture for space (land) and other resources traditionally associated with agricultural activity (water, air, labor, infrastructure investments). All of urban development and much of rural development is irreversible, leading to permanent loss of agricultural land.

In recent years, many agricultural counties have adopted policies to discourage "ranchettes." Tulare County found that, once subdivided, "it is virtually impossible to reassemble the land into viable agricultural units."

### **Increased Land Use Conflict as Urban Land Uses Encroach on Aggregate Resource Extraction Areas**

Land use incompatibility problems between mining operations and nearby residential areas and other sensitive land uses have been increasing in recent years as development encroaches on quarry areas. Impacts to residents include noise, dust and bright lights while impacts to quarry operators include the time and money required to address complaints.

### **Steady Growth of Wind Energy**

The steady growth of installed wind power during the past ten years in California, and especially Altamont Pass, has served as an accelerated period of research and development in the wind industry. In a relatively short period of time, we have seen an evolution of wind turbine technology as the efficiency of the turbines has increased and the cost of wind energy technology has dramatically declined. Wind energy provides more than 1 percent of the total electricity generated in the State and up to 8 percent of the instantaneous electricity demand in the PG&E region during summer peak demand season.

## **■ PLANNING ISSUES**

### **Open Space Protection**

Key issues related to open space protection include:

- Identification and protection of unique and valuable habitats.
- Provision of public access to open space.
- Protection of scenic vistas.
- Provision of public recreation areas.

- Provision of connecting trails between tracts of open space.
- Provision of buffers between environmentally sensitive open space and urban uses.
- Management of open space areas to meet economic, environmental and public access goals.
- Acquisition of land versus achieving open space objectives through regulation; methods of funding open space acquisition.
- Equitable treatment of property owners.

### **Location of Urban Development**

The identification of areas most suited for new urban development should be preceded by the mapping of open space resource lands (described above) and environmentally sensitive lands (described in other sections), which together fall under the definition of open space lands given in California Government Code Section 65560. These lands, outlined below, should be protected from urban development for reasons of quality-of-life, public safety, resource conservation, and recreation:

#### **Open Space Resource Lands**

- Agriculture
- Regional Parks
- Public Watersheds
- Regionally Significant Aggregate Resource Areas
- Windfarms

#### **Environmentally Sensitive Lands**

- Critical Habitat
- Sensitive Viewsheds, Ridgelines, and Community Buffers
- Unique Natural Features
- Cultural Sites

#### **Hazard Zones**

- Steep topography
- Landslide Zones
- Flood Zones
- Fault Zones
- Wildland Fire Zones

### **Siting of Development on Agricultural Parcels**

On July 11, 1991, the Board of Supervisors adopted site development review requirements for residences and industrial buildings in agricultural areas. Agricultural buildings are exempt to avoid interfering with agricultural activities. The primary purpose of the site review requirements is to minimize the visual and environmental impacts of non-agricultural structures. The site development review requirements adopted in 1991 are intended to address these concerns. The site review process involves consideration of many different factors; just a few are ridgeline protection, access, grading, vegetation, and wildlife corridors. However, the County lacks established criteria for the site review process.



Exclusion of accessory uses related to agricultural operations from the site review requirements recognizes the need to avoid unduly burdening agricultural operations with restrictions.

### **Additional Residential Units on Agricultural Parcels**

While the County Zoning Ordinance allows, as a conditional use, additional housing units for those engaged in agricultural operations on a property, some farmers and ranchers have stated a desire for greater flexibility in residential use to allow for extended farm family living arrangements.

### **Small Parcel Agriculture**

Small agriculture parcels might be suitable as an interim use in areas that are planned for urban development. However, the experience in Alameda County and elsewhere is that conversion of these parcels to urban use tends to result in poor traffic circulation patterns, awkward lot configurations, and land use conflicts. Development of larger scale holdings allows comprehensive planning, more effective environmental mitigation and the provision of public amenities that are infeasible for smaller scale projects.

Small agricultural parcels also raise concerns relating to the impact of subdivision on speculative agricultural land pricing and potential land use conflicts between property owners who are primarily residentialists versus agriculturalists.

### **San Francisco Water Department Watershed Lands**

The current planning effort by the San Francisco Water Department presents an opportunity for the County and SFWD to work together to develop integrated plans for the protection of watershed lands. The County can support efforts to maintain water quality by preventing development in areas of the hydrologic watershed not controlled by SFWD but which pose potential erosion/siltation problems. Other efforts can be made to identify areas suitable for very large parcel overlay zoning in locations that would create land use incompatibilities with watershed protection. Joint County-SFWD development of a master plan for the quarries in Sunol Valley should also be undertaken.

### **Wind Farms**

Wind farming is a demonstrable asset to the East County in terms of energy production, revenue production, and protection of open space for grazing. As such, this land use should be supported by County policies. A number of perceived land use incompatibilities associated with its operation and the nature of its equipment have been or are being addressed by other planning efforts. Common complaints by adjacent landowners are the noise of the moving turbines which can be heard at a distance of several miles under certain climatic conditions. Another impact is the number of birds killed by collision with wires or the rotating blades of turbines. Noise problems have been minimized by establishing strict noise setbacks for wind turbines. In a recent study (Biosystems, *Effects of Wind Turbines on Avian Activity, Habitat Use, and Mortality*, 1992), a number of mitigation measures have been proposed to address the latter

problem. Alameda, Contra Costa and Solano Counties have contracted with a planning consultant firm to prepare a mitigation compliance monitoring program, amendments to planning documents, and an environmental impact report for the wind resource areas of the Counties, to be completed by June 1993.

## ■ POLICY IMPLICATIONS

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

### Open Space

- o Protection of regionally significant open space from development*
- o Conservation of land outside of an urban growth boundary as a regional greenbelt*
- o Management of open space areas to meet economic, environmental and public access goals*
- o Acquiring of land in fee or easement versus achieving open space objectives through regulation*
- o Development of methods to fund open space acquisition*

### Residential/Agriculture

- o Establishment of criteria for the site development review process for non-agricultural buildings*
- o Approval of accessory uses on a parcel when justified by agricultural uses on the same parcel*
- o Support of extended farm family living arrangements by allowing second residential units on agricultural parcels*
- o Planning for the housing needs of farm workers*
- o Discouraging creation of additional small agricultural parcels*
- o Protection of commercial agricultural operations from interference by small agricultural parcels*

### Watershed

- o Protection of watershed management lands*

- o Identification of areas suitable for very large parcel overlay zoning*

*Quarries and Regionally Significant Aggregate Resource Areas*

- o Protection of aggregate resource areas for aggregate extraction*
- o Protection of aggregate resource extraction operations from encroaching development*
- o Coordination with SFWD to develop a joint master plan for the quarry area in Sunol Valley*

*Wind Farms*

- o Support of existing wind farm uses and encouragement of expansion*
- o Mitigation of potential land use incompatibilities and environmental impacts*



## SOURCES

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Alameda County, Specific Plan for Livermore-Amador Valley Quarry Area Reclamation, 1981.

Alameda County, Energy Facility Siting Report of the Energy Element (Draft Final Report), prepared by Ebasco Environmental, June 1992.

Alameda County, Environmental Setting of the Energy Element, prepared by Ebasco Environmental, June 1992.

San Francisco Water Department, personal communication with Ed Stewart, Water Resources Manager, August 1992.



## Agriculture

### ■ INTRODUCTION

Agriculture has played an important role throughout the history of the East County. The urban communities that exist today in the planning area were first settled in the mid-1800's to serve local agricultural operations. Livermore and Pleasanton, located on railroad lines that were extended through the Valley during the 1860's and 1870's, were primarily farm centers, serving livestock ranching and grain farming initially, and later, more intensive agriculture including viticulture and fruit and nut orchards. Rapid population growth after World War II created tremendous pressure to urbanize the County's agricultural land, resulting in the loss of much of the County's most productive cropland.

Agriculture continues to make important contributions to the economy, culture and physical environment of the East County. Several ranches are still owned and operated by descendants of early settlers in the area. Many East County residents have chosen to live there because they enjoy the area's rural character. While agricultural production in the County has decreased significantly, the value of Alameda County's agricultural production in 1991 was \$50,702,400. Nearly all of the County's agricultural operations are located in the East County.

### ■ EXISTING CONDITIONS

#### Natural Features Affecting the Viability of Agriculture

The fundamentals needed to sustain agriculture include favorable soils, terrain, climate and water. The mild climate and variety of soil types found in the East County provide excellent conditions for several commodities.

Soils. The designation of "prime agricultural soil" varies depending on the rating system used. There are three commonly-used systems for rating the agricultural value of lands. The first two are based on soil quality, while the third takes soil quality into account along with other factors (including current use of the land). State law also defines prime agricultural land for the purposes of the Local Agency Formation Commission.

*USDA Land Capability Classification System.* According to the USDA Soil Conservation Service, prime agricultural soils are defined as the best land for producing food, feed, fiber, forage and oil-seed crops, and may be subclassed as Prime Agricultural or Prime Range. The delineation of these soils are based on factors such as adequate moisture, acidity, chemistry, depth, drainage, erosion, permeability, and texture. Prime range land includes additional requirements for sustenance of livestock and maximum slopes of 45 degrees. Out of eight classes of soil (I-VIII) recognized by the USDA Soil Conservation Service, Classes I and II are designated as Prime; the remainder are soils of decreasing quality with increasing number. Prime soils are deep to very deep, moderately to well-drained, slow



to moderately permeable, nearly level, and have textures ranging from moderately coarse to moderately fine, or gravelly. Prime soil include several of the soil associations found in the East County, such as Sycamore, Yolo, Zamora, Sunnyvale, and Danville soils.

Class I and II soils in the East County are shown in Figure 8. It is important to note that much of the Class I and II soils in the East County have already been lost to development. The most substantial area of prime soils that has not been developed is located in Mountain House in the far northeastern corner of the County.

*Storie Index.* The Storie Index, developed by R. Earl Storie, is a quantitative system which rates soil based on four factors: Factor A--soil profile; Factor B--surface texture; Factor C--slope; and Factor X--conditions of the soil exclusive of profile, surface texture, and slope, such as drainage, alkali content, nutrient level, erosion, and micro-relief. The most favorable conditions for each factor are rated 100 percent. Less favorable conditions are given lower ratings. The percentage values for each factor are then multiplied together to determine the Storie Index rating of the soil.

Deep soils that are readily pervious to roots receive a rating of 100 percent for soil profile. Medium textured soils, such as loams, receive the highest rating for surface texture. Extremes in texture receive a lower rating. Nearly level or gently sloping land receives a 100 percent rating for slope. As the slope increases, the slope rating would decrease. If two or more conditions considered for Factor X are present, the ratings of each are multiplied together to determine the Factor X rating.

*Farmland Mapping and Monitoring Program.* The California Department of Conservation Farmland Mapping and Monitoring Program monitors the conversion of farmland to and from agricultural use. The Department inventories agricultural land every two years. The results of the inventory are shown on "Important Farmland Series Maps" prepared by the United States Department of Agriculture Soil Conservation Service and modified by the Department of Conservation to show the farmland and urban areas of each county. The classification of a particular property can change over time as conditions on the property (such as the level of development, availability of irrigation, or whether or not the land is under cultivation) change. In this respect, these classifications serve more as an indication of changes in land use than of soil quality.

The Important Farmland Series Maps show land classified into eight categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Grazing Land, Urban and Built-Up Land, Other Land, and Land Committed to Non-Agricultural Uses. The definitions of these classifications are summarized from the Department of Conservation's *Advisory Guidelines* below.

**Prime Farmland** is land which has the best combination of factors suitable for crop production. These factors include soil quality, growing season and water supply.

**Farmland of Statewide Importance** is land which has a good combination of factors suitable for crop production, but does not include land classified as Prime Farmland. Much of the vineyard area in the South Livermore Valley is placed in this classification.

**Unique Farmland** is land treated and managed for the production of specific high economic value crops, but does not include land classified above. Examples of these crops include: avocados, grapes, oranges, olives, rice and cut flowers.

**Farmland of Local Importance** is land either currently producing crops or capable of producing crops and not classified in another category. These lands are designated by the county Board of Supervisors. There is no land in the East County in this classification.

**Grazing Land** is land on which the existing vegetation is suitable for the grazing or browsing of livestock and not classified in another category.

**Urban and Built-Up Land** is land used for residential, industrial, commercial, construction, institutional, public administrative purposes, railroad yards, etc. and other developed uses.

**Other Land** is land not classified in other mapping categories and generally includes the following types of land: rural development with at least one structure per ten acres or building density of less than one structure per 1.5 acres; marginal agricultural lands; brush, timber and other lands not suitable for livestock grazing; government land not available for agricultural use; road systems for freeway interchanges outside of urban and built-up areas; vacant and non-agricultural land larger than forty acres in size and surrounded on all sides by urban development; and other rural land uses.

**Land Committed to Non-Agricultural Use** is land which is permanently committed to non-agricultural uses by decisions of local elected officials. The decisions are ones which cannot be reversed by a majority vote of the city council or county board of supervisors. Land in this category must be designated in an adopted general plan for nonagricultural development.

*Cortese-Knox Act.* The Cortese-Knox Local Government Reorganization Act of 1985 provides a definition of "prime agricultural land" to be used by the Local Agency Formation Commission (LAFCO) in considering sphere of influence changes and annexation requests. Section 56064 provides the following definition: "Prime agricultural land means an area of land, whether a single parcel or contiguous parcels, which has not been developed for a use other than an agricultural use and which meets any of the following qualifications:

- (a) Land which qualifies for rating as class I or II in the Soil Conservation Service land use capability classification.
- (b) Land which qualifies for rating 80 through 100 Storie Index Rating.
- (c) Land which supports livestock used for the production of food and fiber and which has an annual carrying capacity equivalent to at least one animal unit per acre as defined by the



USDA in the national Handbook on Range and Related Grazing Lands, July, 1967, developed pursuant to Public Law 46, December 1935.

(d) Land planted with fruit or nut-bearing trees, vines, bushes, or crops which have a nonbearing period of less than five years and which will return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than two hundred dollars per acre.

(e) Land which has returned from the production of unprocessed agricultural plant products an annual gross value of not less than two hundred dollars per acre for three of the previous five calendar years.

(f) Land which is used to maintain livestock for commercial purposes.

Water. The planning area is served by several aqueducts and canals providing irrigation water. While not "plentiful," rainfall in Livermore is typically about 50 percent greater than in the Central Valley at Tracy. Major threats to the water supply are (1) concern that the State Water Project will not meet its long-term contracts, given that planned water projects have not been built, (2) degradation of groundwater quality, (3) increasing demands from urban users (urban users traditionally have first priority for water), and (4) drought. The availability of water for agriculture is discussed in greater detail in the *Water Supply* background report in Section D.

Access to Markets. The East County is located in close proximity to the Bay Area's six million urban residents, the fourth largest consumer market in the United States. The East County also has access to consumer markets in the urbanizing Central Valley. Easy access to these markets allows for diversification of products and offers opportunities for multiple-uses, such as tourism and recreation. The East County also benefits from agriculture-related activities historically concentrated in the region including processing plants, shipping facilities, specialized labor pools and major produce terminals. Due to its location, the East County has access to agricultural support services in the Central Valley as well as the Bay Area.

### **Economic Factors Affecting the Viability of Agriculture**

A combination of many different factors determine the economic viability of agriculture. These factors include:

Land Price. Land price is an important factor in maintaining the viability of agriculture. If land prices are low, property owners may have difficulty obtaining financing for improvements to their property. If land prices are high, property owners may decide that selling their land for non-agricultural uses is more profitable than continuing their agricultural operations. High land prices also discourage new agricultural operations by making the start-up costs prohibitively high.

Many elements affect the price of agricultural land, including: the general condition of the real estate market, the size of the parcel, the productivity of the land, availability of water, access to agricultural support services, and speculation on future urban development (based on proximity to urban development and access to services and roads). Another element which may affect the price of agricultural land is the value of the land as a homesite. A buyer with no



intention of engaging in agricultural activities may be willing to pay a high price for agricultural land in order to live in a rural environment.

Ability to Obtain Financing. There are two major categories of agricultural loans: real estate loans, which tend to be long-term; and production loans, which are generally short-term. As mentioned above, land value can be an important source of collateral in obtaining long-term financing if the property owner has sufficient equity in the property. In this respect, a property owner who has owned land for a long period of time would have an advantage over someone who is just starting an agricultural operation. Other factors that affect ability to obtain credit include: the size of the agricultural operation, financial history, and the market for the commodities produced.

Taxes. Property taxes do not tend to be a significant burden for owners of agricultural land, especially if the land is under a Williamson Act contract, which removes any speculative value of the land from the tax assessment in exchange for continued agricultural operations. The Williamson Act is discussed in detail under the section on "Planning Issues" below.

Estate taxes, on the other hand, can create a substantial burden when agricultural land is passed from one generation to the next, potentially disrupting the continuation of agricultural activities by forcing the sale of the land.

Production Yields and Markets. In general, a higher crop yield per acre will result in higher profits for the agricultural operation. While the amount of cropland in the County fell dramatically between 1947 and 1987, transition to more intensive production techniques approximately doubled the production value per acre.

Changing consumer preferences can also affect profitability. Farmers respond to shifting demand for agricultural products by changing the types of crops produced. Recent changes in the types of grapes produced in the South Livermore Valley is an example of agricultural production responding to market demand. How well farmers can respond to market trends depends on the range of crops the land can support. Irrigated prime soil provides the greatest flexibility since it is suitable for a variety of crops. Cattle ranchers, on the other hand, have little flexibility since their land may have few agricultural uses besides grazing.

Production Costs. Before an agricultural commodity can be produced, the property owner must invest in a variety of capital improvements and production inputs. Irrigation systems, fencing, and agricultural buildings are examples of capital improvements. Maintenance of these improvements can also be a significant expense. The ability of a property owner to obtain financing is a major factor in funding capital improvements.

Production inputs include equipment, water, energy, and supplies such as fertilizers and seed. Significant changes in the availability or cost of these inputs can dramatically affect the viability of an agricultural operation.

## Existing Parcel Sizes

Adequate farm size is important to maintaining the productivity of agricultural land. The average farm in Alameda County is moderate in size, 349 acres--close to the statewide figure of 368 acres. Statewide, 79 percent of harvested cropland is on farms over 260 acres; only 6 percent is on farms under 50 acres. In Alameda County, 67 percent is harvested on farms over 260 acres; 7 percent on farms under 50 acres.

Due to the County's 100-acre minimum zoning, adopted in 1972, there are relatively few very small parcels in agricultural areas. However, there are clusters of parcels under 40 acres, subdivided prior to current zoning. The largest concentration is along Tesla Road. However, smaller groupings can be found north and south of I-580 near the San Joaquin County border, along Mines Road, east of Calaveras Road near the Santa Clara County border, northeast of the intersection of Vallecitos Road and I-680, and scattered throughout the area north of the City of Livermore.

## Status of Williamson Act Contracts

The use of Williamson Act contracts as a technique for preserving agricultural land is discussed in detail in the "Planning Issues" section. The owner of an agricultural parcel may enter into a contract with the county in which the owner agrees to maintain agricultural operations on the parcel. In exchange, the county assesses the property based solely on the agricultural value of the parcel, lowering the property tax obligation of the property owner. The contracts are valid for a ten-year period and are automatically renewed every year unless the property owner files for non-renewal. If an application for non-renewal is filed, the contract terminates at the conclusion of the ten-year term. Cancellation can occur only under limited circumstances.

The vast majority of the agricultural land in Alameda County is under Williamson Act contract. According to the State Department of Conservation's *1990-91 Williamson Act Status Report*, a total of 161,657 acres were under contract as of 1991. As of February 1991, land owners had filed to non-renew Williamson Act contracts on nearly 23,000 acres in the County. Most of these lands are near the Cities of Dublin, Livermore and Pleasanton and in the Mountain House area. Figure 9 shows the status of Williamson Act contracts in the East County.

## Subarea Characteristics

Many subareas in the East County have unique characteristics that determine suitable agricultural uses:

West Dublin. The West Dublin subarea is bounded by the Contra Costa County line to the north, the City of Dublin to the east, I-580 to the south, and Castro Valley to the west. Many steep ridges and canyons dominate the area's terrain. Grazing is the primary agricultural activity on the grassy slopes. There is also some hay production in the area.



East Dublin/Doolan Canyon. The East Dublin/Doolan Canyon Area is located east of the City of Dublin and north of I-580, between Dublin and the North Livermore Valley. The terrain in the area ranges from relatively flat land to the south, adjacent to I-580; to gently rolling grassy hills; to progressively steeper hills to the north. The major agricultural use in this area is cattle grazing, which occurs mainly on the hilly portions of the area. Hay and barley are cultivated on the flatter lands, near I-580.

North Livermore Valley. The North Livermore Valley lies between the City of Livermore and the Contra Costa County border. This subarea encompasses the Las Positas Valley which is a wide, relatively flat valley with steep hills to the north, east and west. Grazing and dry land crop cultivation are the dominant agricultural uses in the area. Barley and grain hay are the primary crops.

South Livermore Valley. The South Livermore Valley includes approximately 15,500 acres of relatively flat land located south and southeast of the City of Livermore. This area, known as the "Fertile Crescent," contains a significant amount of the County's remaining arable lands. The climate and soils of the Valley are particularly well suited for the production of wine grapes, which have been grown here for nearly 150 years.

Urbanization, combined with increased development speculation and changing market conditions, has resulted in a steady decline over the years in both the acreage of productive vineyards and the number of active wineries in the Valley. Alameda County has developed a South Livermore Valley Area Plan which is intended to preserve remaining vineyards and wineries in the area, enhance the recognition and image of the area as an important premium wine-producing region in California, create incentives for investment and expansion of vineyards and other cultivated agriculture in the area, and coordinate the policies of Alameda County, Pleasanton, and Livermore so that these goals can be achieved.

Altamont Hills. The Altamont Hills are rolling, grass-covered hills located in the eastern portion of the East County. The subarea runs diagonally across the northeast corner of the County, from the Contra Costa County border to the north, east of the City of Livermore and southwest of Mountain House, to the San Joaquin County border to the east. The primary agricultural use in the subarea is grazing. Much of the rangeland in this area is classified as "prime rangeland" by the U.S.D.A. Soil Conservation Service. Windfarms, for the purpose of generating electricity, are located on ridgelines throughout the rangeland. The windfarms are considered compatible with grazing operations, since cattle are allowed to graze on the land surrounding the turbines. There is some dry land farming south of I-580, in the area surrounding Patterson Pass and Tesla Roads.

Along Tesla Road, there are several clusters of parcels under 100 acres (with some as small as two acres) which were created before the County's current 100 acre minimum parcel size was enacted. The raising of animals is the most common land use on these parcels. There is also some cultivation of crops that are not land intensive.



Mountain House. The Mountain House Subarea consists of a relatively flat area located in the County's extreme northeast corner. Geographically and economically, the subarea is part of the San Joaquin Valley. The subarea borders San Joaquin County on the east and Contra Costa County on the north.

The area is comprised almost entirely of soils that are rated prime, unique or of statewide importance, according to the U.S.D.A. Soil Conservation Service and the California Department of Conservation. Agricultural production includes irrigated field crops, mainly sugar beets and corn; and irrigated pastures, mainly alfalfa. Truck crops are also raised.

Irrigation water is provided by the Byron-Bethany Irrigation District (BBID) (see the *Water Supply* background report in Section D).

South Ridgeland. The South Ridgeland Subarea comprises much of the southern half of the East County and consists primarily of rangeland and steep hills. Predominant land uses in the area are grazing and recreation on large parcels. Relatively remote from existing cities, the area is not well-provided with roads, utilities or other urban facilities and services.

Sunol Valley. The Sunol Valley Subarea consists of a long, narrow strip of land along the western boundary of the East County area, running from the southwest corner of the City of Pleasanton to the Santa Clara County border. Intensive agricultural operations are clustered near the intersection of Niles Canyon Road, Calaveras Road and I-680. Nursery operations are the predominant agricultural use in this area. Some prime agricultural soils are present in the Alameda Creek area toward the eastern end of Niles Canyon, in the vicinity of active sand and gravel quarries. Many of the same factors that create favorable conditions for sand and gravel mining also contribute to the quality of the soil for agriculture. Most of the remainder of the subarea is covered with steep ridges and narrow canyons running, generally, northwest to southeast. There is some grazing activity in the upland areas.

The small unincorporated community of Sunol is located northwest of the intersection of Niles Canyon Road and I-680. Kilcare Canyon, which runs northward from Sunol, is developed with low-density residential uses. The majority of the land to the south of Niles Canyon Road is owned by either the San Francisco Water District or the East Bay Regional Park District.

The Vargas Plateau lies along the western boundary of the subarea, on either side of I-680. The western side of the plateau is within the boundaries of the City of Fremont; the remainder to the east is unincorporated and is therefore in the County's jurisdiction. The plateau is a combination of rolling, grass-covered hills and relatively flat areas. The primary agricultural use in this area is grazing.

West Pleasanton. The West Pleasanton subarea is bounded by I-580 to the north, the City of Pleasanton to the east, the Sunol Valley subarea to the south, and the planning area boundary to the west. The topography of the area consists of steep ridges and narrow canyons running, generally, northwest to southeast. Grazing is the predominant agricultural use. A producing vineyard is located adjacent to Palomares Road in the southern portion of the subarea.

## ■ TRENDS

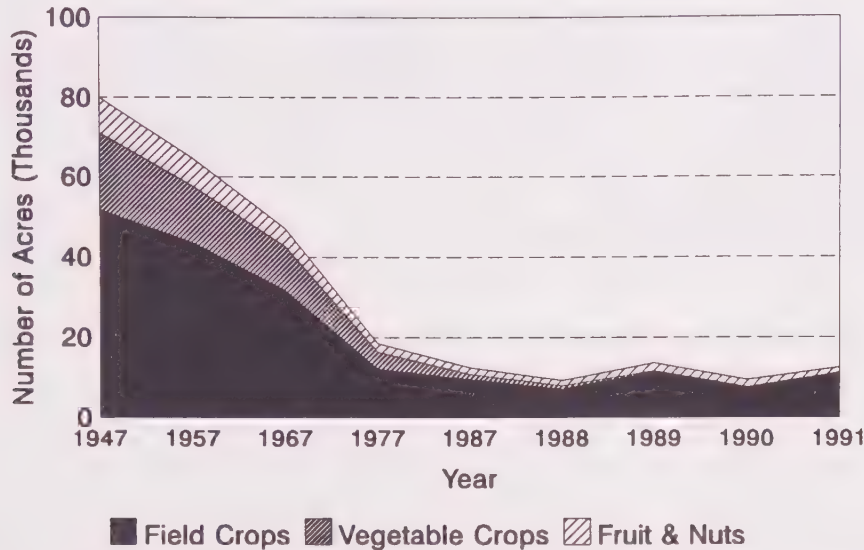
### Loss of Productive Farmland to Urban Development

Since the 1940's, Alameda County has lost over 80 percent of its productive cropland due to the growth of cities. This growth occurs first on the flatter lands that are both easier to develop and have the best agricultural soils. The greatest loss has been in the Hayward and Fremont areas, where agriculture has nearly vanished. In the East County, too, several thousand acres of cultivated land, much of it prime soils, have disappeared under the expanded cities of Livermore, Pleasanton, and Dublin. Table A-3 shows the number of acres of land under cultivation countywide in each major crop category between 1947 and 1991. The graph below, titled "Alameda County Cropland Acreage," illustrates these numbers.

<b>TABLE A-3</b> <b>ALAMEDA COUNTY CROPLAND ACREAGE</b> <b>(Excluding Rangeland)</b>				
<b>Year</b>	<b>Field Crops harvested acr.</b>	<b>Veg. Crops harvested acr.</b>	<b>Fruit &amp; Nuts bearing acr.</b>	<b>Total Cropland Acreage</b>
<b>1947</b>	51,725	19,381	8,979	80,085
<b>1957</b>	43,624	13,955	7,107	64,686
<b>1967</b>	31,778	10,939	4,410	47,127
<b>1977</b>	12,210	4,130	2,058	18,398
<b>1987</b>	9,600	1,270	1,654	12,525
<b>1988</b>	7,035	800	1,410	9,245
<b>1989</b>	11,303	350	1,996	13,649
<b>1990</b>	7,348	246	1,751	9,345
<b>1991</b>	10,818	260	1,408	12,486
<b>Source:</b> Alameda County Agricultural Commissioner				

Recent fluctuations in cropland acreage have been caused mainly by changes in the number of acres of field crops and grapes. While cropland acreage has remained relatively constant over the past few years, without strong land use controls it is likely that most remaining cultivable lands in the East County will be developed. A majority of the East County's cultivated acreage is already within various planning study areas of the cities.

## ALAMEDA COUNTY CROPLAND ACREAGE (Excluding Rangeland)



Source: Alameda County Agricultural Commissioner

In contrast to cropland, the County's supply of range pasture has remained fairly stable. This is because most range is on remote or hilly parcels that have been less attractive for urban use. Recently, however, owners of hilly tracts near existing cities have also filed for non-renewal of Williamson Act contracts, indicating an interest in converting this land to urban use.

### Encroachment of Incompatible Land Uses

Encroachment of urban development into agricultural areas has led to conflicts between farmers and the new residents. Among the nuisances cited by residents are:

- Pesticide use, especially aerial spraying.
- Noise from aerial crop dusters, bird frightening devices, pumps, sprinklers, wind machines, heavy equipment and tractors. Night use of wind machines, irrigation equipment and harvesting equipment are especially annoying.
- Lights associated with night harvesting.
- Dust.
- Flies.
- Odors due to fertilizers, manure and crop processing.
- Accidental poisoning of pets due to rodent control.



At the same time, urban development may interfere with agricultural operations. Farmers object to:

- Increased trespass and vandalism.
- Theft; crop pilferage.
- Harassment of livestock by neighbor dogs.
- Introduction of exotic species from urban gardens.
- Erosion, flooding and siltation due to residential developments.
- Time, energy and expense required to respond to neighbor conflicts and complaints to government agencies.
- Increased liability.
- Restricted operations.

### **Degradation of Air Quality**

Air quality is also threatened by increasing urban development. Catalytic converters have reduced motor vehicle emissions, but gradually rising traffic volumes are projected to neutralize this benefit over time. Studies show that air pollution, particularly ozone, can have a detrimental effect on crop yields. While current air pollution levels in the East County are not seriously limiting, future changes in land use and traffic could possibly reduce yields.

### **Increased Development Pressure**

As urban development approaches agricultural parcels at the fringe of the urban area, the anticipation that these agricultural parcels, too, will be developed in the near future can adversely affect agricultural operations. The uncertainty arising from these development pressures tends to discourage new agricultural investment and uses. Property owners are less willing to make large capital investments in their agricultural operations if they feel that agriculture may no longer be viable on their property over the long term. Anticipated development raises the price of the agricultural land, making purchase for farming unrealistic, and increases the likelihood that it will be purchased for nonagricultural uses.

### **Non-Renewal of Williamson Act Contracts**

The non-renewal of Williamson Act contracts on agricultural parcels generally serves as an indication that the property owners anticipate development of the parcels. Non-renewal of contracts in the East County has been most prevalent at the fringe of the urban area, although many property owners in the Mountain House area have also filed for non-renewal.

### **Trends in Crop and Livestock Production**

Over the last 40 years, the County's agricultural sector has shown a decline in the value of production of nearly all major commodities. In constant dollars, total production value of all sectors in 1987 was roughly one-third of the 1947 value. On a per acre basis, however, production value in constant dollars approximately doubled over the 1947-1987 period, indicating a transition to more intensive kinds of crop production. Recent declines in several sectors of

Alameda County's agricultural production, most notably livestock and certain field crops, can be attributed at least in part, to the effects of the current drought.

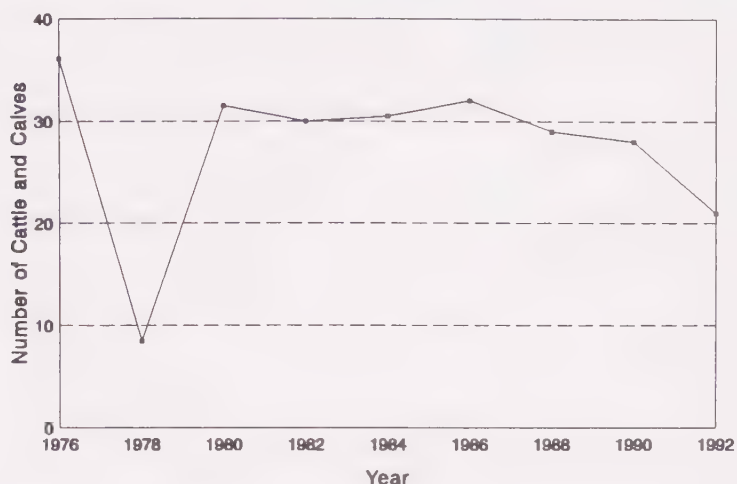
Production of nursery products expanded significantly during the 1970's in response to rising demand. However, since 1989 the production value of the County's nursery products has fallen off due to the loss of several cut flower and nursery stock producers. Within the planning area, nurseries are concentrated in the Sunol Valley.

The County's livestock inventory, comprised mainly of cattle, has been steadily declining since the beginning of the current drought in 1986. The extended drought during the mid-1970s also caused a drastic temporary decline as herds were relocated or sold. However, the herds were quickly reestablished once the drought ended. How quickly the herds can be reestablished after the current drought depends on the amount of caution with which ranchers approach replacing their cattle, the cost of replacement cattle, and how quickly the grasses are restored on the rangeland. Table A-4 contains the number of cattle and calves in the County since 1976. The graph titled "Alameda County Livestock Inventory," following the table illustrates the fluctuations in these numbers.

TABLE A-4	
Alameda County Livestock Inventory (Cattle & Calves)	
Year	Number of Cattle & Calves
1976	36,100
1978	8,500
1980	31,500
1982	30,000
1984	30,500
1986	32,000
1988	29,000
1990	28,000
1992	21,000
Source: Alameda County Agricultural Commissioner	

## ALAMEDA COUNTY LIVESTOCK INVENTORY

### All Cattle and Calves



Source: Alameda County Agricultural Commissioner

In recent years, a few agricultural categories have actually grown or show signs of recovery. In the Mountain House subarea, farmers have switched from sugar beets, corn and beans to alfalfa and hay. The drought since 1986 has led to higher prices for these feed crops.

After many years of decline, wine grape production reached its highest level ever in 1989, largely due to increased yields per acre. Recent decreases in wine grape production can be attributed to vintners removing acreage from production to graft new types of grapes onto existing vines in response to market changes. (See Table A-5 below.)

TABLE A-5			
Alameda County Wine Grape Production			
Year	Acreage	Harvested Tons	Yield Per Acre (tons)
1940	3,380	6,500	1.9
1950	2,754	4,100	1.5
1960	2,238	3,080	1.4
1970	1,600	3,200	2.0
1980	1,660	3,918	2.4
1988	1,216	4,094	3.4
1989	1,812	7,615	4.2
1990	1,628	3,435	2.1
1991	1,286	4,938	3.8
Source: Alameda County Agricultural Commissioner			



## **Loss of the Family Farmer**

The full-time family farmer is fast disappearing in Alameda County and elsewhere. Statewide, farming is now the principal occupation of only 50 percent of farm operators; the remaining 50 percent get most of their income from non-farm occupations. Even among those who are principally farmers, many supplement their incomes from non-farm sources. In Alameda County, only 38 percent of farmers receive most of their income from farming. The County's farm operators are highly knowledgeable, with an average of 15 years experience. About 70 percent were individual or family operations in 1987, down from 87 percent in 1978. Many lease some or all of the land they farm. Tenant operators are responsible for 42 percent of harvested cropland and 30 percent of all farmland acreage in the County.

## **■ PLANNING ISSUES**

### **Is Agriculture Still Viable in Alameda County?**

The East County's natural features--soils, climate, and access to water--are very well suited for agricultural use. The East County has good access to agricultural services and markets. The availability of commercial-size parcels and experienced farm operators is also very favorable. Last, there continues to be a consumer market for the particular products that are suited to growing conditions in the planning area.

On the other hand, the amount of agricultural land, especially cropland, has fallen sharply. The amount of land must be kept above a minimum threshold in order to ensure continued agricultural services and facilities, economies of scale, and protection from encroachment by incompatible land uses.

### **Is Agriculture in Alameda County Worth Preserving?**

Another question to consider is whether the public benefits of agriculture are significant compared with other potential land uses, such as residential or industrial development. Although, parcel-for-parcel, agriculture does not generate as high an economic return as many urban uses, this does not lessen the desirability of preserving farmland in suitable areas. The County's agricultural sector directly contributes nearly \$51,000,000 in production value to the local economy. Local production provides food for consumers and a local food reserve. It preserves a productive resource whose value to the region is likely to increase over time. Replacement costs, on the other hand, are likely to rise. Further, shifting production to less suitable soils may lower overall productivity and cause soil problems, such as erosion or salinity, at the new location. The traditional place to relocate agriculture, the Central Valley, is no longer readily available for expansion of agricultural operations. Shifting production abroad removes jobs from the local economy. Further, as the American Farmland Trust observes, pesticides banned in the U.S. are in widespread use in other nations.

Agriculture has secondary benefits as well. It protects and manages watershed land and preserves productive resource areas (minerals; gravel). It may provide an opportunity to reuse

treated urban wastewater--helping solve a major constraint on urban growth. Agriculture can include supplementary commercial uses, such as wineries and bed-and-breakfast inns, that stimulate tourism. Agriculture also helps define and separate urban communities and provides open space. Indeed, state law specifically defines "open space" to include "rangeland" and "agricultural lands."

### **How Can We Ensure That Agriculture Remains Viable?**

Preserve productive soils. A major threat to agriculture is the conversion of valuable soils to urban use, noted earlier. While crops such as wine grapes do not require prime soils, such soils provide flexibility in agricultural use as market conditions change over time. At present, major concentrations of such soils are in the Mountain House area and in parts of the South Livermore Valley.

Protect agricultural operations from the encroachment of incompatible land uses. Historically, agricultural operations have not proven to be compatible with urban residential use. Courts have generally sided with the residential dweller, especially if health risks may exist. There are two basic approaches to reducing the conflict between urban and agricultural uses: (1) buffers, which may involve either physical separation or barriers, and (2) granting farmers legal protection from nuisance claims.

Many jurisdictions now require that urban developments be set back from adjacent farms. Within the setback, limited uses are allowed such as streets, utility easements, landscaping, recreation and parking. Developers may "feather" densities so that deeper lots are located adjacent to agriculture, with higher densities farther away. There is no consensus on an adequate buffer distance. San Luis Obispo County requires buffers ranging from 50-200 feet for rangeland/pasture to 400-800 feet for vineyards and irrigated orchards. Sonoma County uses buffers of 100-200 feet. The City of Napa requires 60 feet but is considering a policy which would require 100 feet adjacent to grazing lands and 200 feet adjacent to more intense uses, such as vineyards and croplands. Lake County requires 300 feet between agriculture and residences if there is aerial spraying. Santa Cruz County uses a 200 foot setback adjacent to "prime agricultural land." In their study of the South Livermore Valley, Livingston & Associates recommended an open space buffer at least 100 feet wide where vineyards and other cultivated agriculture adjoin urban development.

In addition to a physical setback, some jurisdictions require fencing and vegetative screening. This is particularly effective against dust and may also have an aesthetic and "psychological" value in reducing adverse public reaction to agricultural operations. Vegetation is less effective against other nuisances, such as noise and odor.

Many counties, including Alameda County, have adopted "right-to-farm" ordinances. These protect normal, standard agricultural operations from nuisance complaints by adjacent property owners. A grievance procedure may also be established. Some ordinances require notice to home buyers in farming areas that they are subject to noise, dust, odors and other impacts of commercial agricultural operations. However, such an ordinance cannot invalidate state laws pertaining to health, nuisances, etc. The notification of new residents of potential nuisances may



also be required as a condition of approval for new developments. Ruby Hill is an example of a development on which such a condition of approval was imposed.

Maintain irrigation and agricultural support services. A key element in maintaining viable agriculture in the East County is the agricultural "support system." This includes businesses and services that are necessary for agricultural operations. Examples include farm equipment sales and service agencies, feed suppliers, agricultural supplies dealers, livestock transport services, livestock dealers, veterinarians, farm labor, financial and loan services, and wine making equipment and supplies. The Livermore Valley area, the Central Valley, and the greater Bay Area contain those services necessary to serve the East County's existing agricultural base.

The support system also includes facilities such as good roads for access to markets and irrigation water. Untreated water is provided to agricultural users by Zone 7 Water Conservation and Flood Control District from three main sources: (1) the South Bay Aqueduct (part of the State Water Project), (2) Lake Del Valle, and (3) local groundwater. The potential loss of irrigation water supplied by the State Water Project poses at least a hypothetical threat to the continued viability of irrigated crops. The State Water Project's policy in drought periods is to reduce or eliminate water allocations for agriculture before any reductions in allocations are made to municipal and industrial users. Generally, this is also the policy of local water agencies.

Allow commercial uses that enhance agriculture. One potential means of supporting agriculture in the East County may be to permit additional commercial uses in agricultural areas. Compatible commercial uses can help preserve and enhance agriculture by bringing in tourist dollars, by providing supplementary sources of income for farmers and ranchers, and by improving the market for local products. On the other hand, there is a risk that encroachment by commercial uses could encourage speculative increases in land prices, and could be a step toward urbanization and the ultimate decline of agriculture.

Certain commercial uses are directly supportive of agriculture. For example, produce stands or a farmers' market selling locally-grown produce could expand the market for local products. There is a strong interest in promoting the Livermore Valley as a center of viticulture, with wineries as a critical feature. A winery might include facility tours and tasting rooms, and retail sales of local wines, locally-made crafts and farm produce. It may include small restaurants, picnic areas and bicycle rentals.

The East County's wineries, recreational areas and scenic setting create a unique opportunity to attract visitors. However, the Valley lacks supporting facilities and amenities. These may include restaurants, small groceries, bed-and-breakfast inns, hostels, bicycle rentals and service, antique stores, art galleries, gift shops, tourist information and transportation-related businesses, and a wine museum. These uses could be designed to provide a "Wine Country ambiance."

Commercial stables and guest ranches would be compatible with the equestrian character of many areas of the East County. Resorts, conference centers, campgrounds, golf courses and other outdoor recreational facilities would attract visitors who may patronize other commercial uses while in the area.



There are also potential disadvantages to commercial uses. They may detract from the rural character of their surroundings and may adversely affect existing residents by increasing congestion, noise and pollution. Commercial development may have adverse impacts on the environment if it is not sited and designed carefully to avoid sensitive areas or if it attracts a large number of people. Agricultural land of varying degrees of productivity would be lost. There may be conflicts between commercial uses and adjacent agricultural operations. Providing services to the new development could result in higher costs to the County.

The potential disadvantages could be minimized by placing strict conditions on commercial uses to ensure that they do not interfere with ongoing agricultural activities or degrade the quality of life of existing residents. Development should be limited to less productive and less environmentally sensitive land. Commercial uses should not compete with agricultural uses for water. High water use operations such as golf courses should be required to demonstrate a water source that does not compete with existing or potential agricultural uses. Treated wastewater should be reused whenever feasible. Development should be limited in size and should be designed in keeping with the rural character of its surroundings. Buffers may be necessary between some commercial uses and agricultural operations to minimize conflicts. Some of the impacts of commercial uses may be mitigated by required dedication of an agricultural easement or the payment of in lieu fees for the purchase or improvement of other agricultural land.

Minimize cancellations of Williamson Act contracts. Alameda County has a long-standing policy of discouraging the cancellation of Williamson Act contracts. The *Alameda County Agricultural Preserves Objectives, Uniform Rules and Procedures* requires that before a contract may be cancelled a finding be made by the Board of Supervisors that "...the cancellation is not inconsistent with the purposes of the California Land Conservation Act of 1965, and is in the public interest." It further states: "The existence of an opportunity for another use of the land involved, or the uneconomic character of an existing agricultural use, will not be sufficient reason for cancellation of the contract."

### **A Long-term Commitment to Agriculture**

Given that agriculture is a viable and beneficial land use in the East County, the question arises as to the best ways to protect this use. Clearly, as described above, it is important to support the economics of agriculture by allowing limited commercial use such as wineries, by maintaining parcel sizes sufficient to attract and retain commercial agriculture, by buffering incompatible land uses, and by ensuring that the necessary agricultural support facilities and services are available. However, none of these devices specifically takes into account the fact that the East County's agricultural areas are relatively near urban development and none addresses the need for a long-term commitment to agriculture as a means of discouraging land speculation and development pressures that can undermine the most supportive agricultural economics. The following discussion summarizes alternatives available to secure the long-term commitment to agriculture:

Public Acquisition of Full Title. The surest means of controlling the future use of land is to acquire full title by outright purchase or donation. A public agency or qualifying non-profit organization, such as a land trust, may acquire agricultural land. Sometimes an agency will own and manage the land. For instance, park districts have established historic or "museum" farms such as Ardenwood in Fremont, Ravenswood in Livermore or Deer Hollow Farm near Mountain View. Often, agencies lease land to others for agricultural operations. The East Bay Regional Park District leases rangeland for cattle grazing. The Mid-Peninsula Regional Park District leases portions of its Picchetti Ranch for the Sunrise Winery. Agencies may also re-sell the land, with an agricultural easement over all or part of the property. Many different mechanisms may be used to fund the purchase of agricultural land. Examples include special assessment districts, Mello-Roos Community Facilities Districts, development mitigation fees, lease agreements and bonds.

Advantages of Fee Simple (Full Title) Acquisition:

- Acquisition is the surest way of preserving agricultural land in perpetuity.
- The purchasing entity has complete control over use of land.
- The purchasing entity can allow public access to provide for both agricultural uses and recreational uses such as hiking trails.
- Public agencies may have funds available to improve the land or facilities.
- Donation of land to a qualified entity may provide tax benefits to the donor.

Disadvantages of Fee Simple (Full Title) Acquisition:

- Acquisition is generally more costly, at least initially, than other preservation techniques.
- The property is removed from County tax rolls.
- The cost of property maintenance and liability is borne by the purchasing entity.
- The amount of land that can be bought is limited by the resources of the entity purchasing the property.
- Private owners may have greater management skills and direct interest.

Agricultural Easements. An agricultural easement restricts the type and amount of development on a property to agricultural or related activities (only compatible uses such as windfarms are typically allowed; a residence area may be excluded from the easement; farm-related structures are permitted). The property owner retains all other rights, including the right of sale. Because the easement is recorded on the property title in perpetuity, subsequent property owners are subject to its restrictions.

Easements must be acquired by a public agency or a qualifying non-profit organization, such as a land trust. Under certain circumstances, the property owner may donate an easement for tax advantages. Easements may be purchased by a public agency or land trust--this can be done through a competitive application process--or an easement may be dedicated as a condition of property subdivision or to mitigate certain environmental impacts. Installment-purchase financing is an option that may allow an agency to purchase an easement for as little as 50 to 60 percent of its appraised value. This discount is due to extensive tax benefits the property owner may receive. Under an installment-purchase agreement, the government agency agrees to pay interest only for a period of years and a balloon payment at the end of this period. In



exchange, the property owner receives a steady cash flow of tax exempt interest, deferral of taxes on capital gains, better estate planning, and a charitable tax deduction.

The property owner is not required to permit public access to the property under an agricultural easement, however the entity holding the easement would usually inspect the property annually to ensure compliance with the terms of the easement.

**Advantages of Acquisition of Agricultural Easements:**

- Easements provide for permanent preservation of agricultural land.
- The property remains in private ownership and management.
- Easements do not interfere with ongoing agricultural operations.
- Selling or donating easements may provide income, estate and property tax benefits to property owners.
- Cost of maintenance of the land continues to be borne by private property owner.
- The property remains on County property tax rolls.
- Easements can be designed to meet special circumstances.
- Acquisition of easements can be less costly initially than acquisition of full title.

**Disadvantages of Acquisition of Agricultural Easements:**

- The number of easements that can be acquired is limited by the resources of the entity holding the easements, making it necessary to limit acquisition to high priority areas.
- An entity, such as a land trust, must be established to hold and monitor the easements in perpetuity.
- Property tax revenue from property with easements is reduced.
- Transaction agreements can be very complicated.
- Property owners may view easements as overly restrictive and, therefore, undesirable since they severely limit property owners' options for future use of their property.

Transfer of Development Rights. A Transfer of Development Rights (TDR) program permits agricultural land owners to sell "development rights," while retaining title to their property as agricultural land. Under a TDR program the county would designate "sending" and "receiving" areas. Sending areas are those from which development rights are bought: the areas that are to remain agricultural. Receiving areas are those to which development rights from the sending areas are sold: areas considered more suitable for development. An owner of property in a sending area may sell the development rights from that property directly, through a private transaction, to an owner of property in a receiving area, who can then use the purchased development rights to develop that property at a higher density than would otherwise be permitted by law. Once a property's development rights are sold, future use of the property is restricted by permanent easement to agricultural activities. The property owner may sell the land, but subsequent owners are subject to the restrictions imposed by the easement.

The "development rights" owned by the agriculturalist cannot be used on the agricultural property. The "rights" only have a value to property owners in receiving areas. The amount of "development rights" is determined by the government agency based on the planned development intensity to be promoted in the "receiving" area. The "rights" are then distributed among property owners in the agricultural area according to criteria established by the



government agency. The details of a TDR program can vary greatly depending on the circumstances in the sending and receiving areas. A program must provide adequate incentive for property owners in both the sending and receiving areas to participate. Many TDR programs have been established but never used because they provide little or no incentive for property owners.

A TDR program would be most appropriate for subareas of the planning area containing productive agricultural areas that should be preserved and less environmentally sensitive areas that can support higher density development.

**Advantages of a Transfer of Development Rights Program:**

- Provides for permanent preservation of agricultural land.
- Development shifts from productive farmland to areas more suitable for urban uses.
- Property remains in private ownership and management.
- The cost of maintenance of the land continues to be borne by private property owner.
- The cost of preservation of agricultural land is absorbed by property owners who purchase development rights.
- Property owners who sell development rights share in the economic gain from development.
- The sale of development rights may provide estate and property tax benefits by lowering the value of the property from which the rights are sold.
- The property remains on county property tax rolls.
- Lower property tax revenue from property from which development rights are sold maybe compensated by higher property tax revenue from receiving property.

**Disadvantages of a Transfer of Development Rights Program:**

- A TDR program is difficult and expensive to administer. There have been very few successful programs implemented in the U.S.
- A TDR program is difficult to implement where control of land use may pass to another jurisdiction, such as by city annexation. Where more than one jurisdiction may be involved, long-term interjurisdictional cooperation is essential.
- A TDR program is difficult to implement unless property owners who buy development rights are assured that their interests are permanently vested.
- The county must be willing to accept higher density development in the designated receiving areas in exchange for lower density in the sending areas.
- The receiving areas must have adequate infrastructure to support the increased density.
- Government funds are required to fund monitoring and enforcement of the restrictions imposed by the sale of development rights in perpetuity.
- The program must provide adequate incentives for both buyers and sellers of development rights to create a market for them.
- Owners of receiver sites must have larger economic incentives to have higher density that they could not obtain by simply rezoning their land.
- Owners of properties suitable for urban development may resent having to "share the wealth" with owners of lands suitable for continued agricultural use.
- A program may require intermediary money from the implementing jurisdiction, in the form of bond guarantees, to maintain the value of the development rights.
- TDR program's raise the legal issue of compensation for down-zoning.

Purchase of Development Rights. Purchase of Development Rights (PDR) program is a variation of a TDR program in which the development rights are purchased by a government agency rather than a private property owner. If there is insufficient demand in the private market for the development rights that property owners in the sending areas wish to sell, a government agency purchases them and auctions them at a later time. A PDR program may be combined with a TDR program to add stability to the market.

**Advantages of a Purchase of Development Rights Program:**

- PDR programs eliminate the potentially unstable private market for development rights.
- Property owners who sell development rights profit from the development potential of their land without the development taking place.
- At least initially, there is no need to identify receiving areas in which density is increased.

**Disadvantages of a Purchase of Development Rights Program:**

- PDR programs require public funds to acquire the development rights, so that the amount of development rights acquired is limited by the resources available.
- Property owners may lack adequate incentive to sell their development rights.
- The public agency may end up holding the development rights indefinitely.

Williamson Act. The Williamson Act, California Government Code Section 51200 et seq., is a state law which established a program that allows an owner of agricultural land to enter into a contract with the county in which the owner agrees not to develop the land under contract and to continue agricultural activities, or uses deemed by the county to be compatible with agriculture, on it. In exchange, the property tax assessment for the land is based on its agricultural value, without consideration of its development potential. The contract is in effect for a ten year period and is automatically extended annually for one year. A property owner or the county may file for non-renewal at any time, in which case the contract would expire in ten years. A contract may be canceled under very limited circumstances. County Williamson Act guidelines restrict the use of the land and include minimum parcel sizes. A large portion of the agricultural land in the East County is currently under Williamson Act contract. However, the owners of many parcels adjacent to the existing urban areas and in the Mountain House area have filed for non-renewal, indicating a possible interest in developing their properties.

**Advantages of the Williamson Act:**

- Property owners with land under contract can avoid property tax increases based on the development potential of the land.
- Government agencies are assured that the land will not be developed over the mid-term (10 years).

**Disadvantages of the Williamson Act:**

- Property tax revenue from land under contract is reduced.
- Property under contract is not permanently preserved.
- Property owners cannot benefit from development in the short- and mid-term.



- Tax advantages of Williamson Act contracts have been reduced by Proposition 13, which strictly limits property tax increases.

**Zoning Regulations.** The zoning ordinance can be used to implement general plan policies regarding the preservation of agricultural land by establishing minimum parcel sizes and limiting the type and density of land uses in agricultural zones. Zoning can also regulate how and where development can occur. Zoning regulations can take many forms. A few examples are described below:

*Large lot zoning* establishes large minimum lot sizes to restrict the density of development and to preserve parcels of adequate size to allow for continued agricultural practice.

**Advantages of Large Lot Zoning:**

- It is an established method of maintaining low densities and is easily enforced.

**Disadvantages of Large Lot Zoning:**

- Zoning designations are not permanent and can be changed.
- Determining appropriate minimum parcel sizes is difficult and controversial.

*Cluster zoning* is similar to a TDR program in that density is transferred to areas suitable for residential use, and an easement is placed on the land that is to remain agricultural. However, with cluster zoning, the density is typically transferred within the same parcel or within a limited subarea. Also, the development rights involved are inherent in the property; that is, the land owner has the option of developing the units on separate and distinct parcels (provided standard conditions for building sites can be met). By comparison, under a TDR program, the development "rights" only have value in the receiving area.

**Advantages of Cluster Zoning:**

- It can provide for permanent preservation of large parcels once development is clustered.
- It allows flexibility in the siting of new development on a parcel, to take advantage of environmental features and values.
- New development is directed away from productive farm land and environmentally sensitive areas.
- It is easier to provide services to clusters of houses than to the same number of houses distributed over a large area.
- Cluster zoning can be used to minimize the visual impact of development in scenic corridors.

**Disadvantages of Cluster Zoning:**

- Clusters of housing at relatively high densities may be incompatible with agricultural operations.
- It may be more difficult to provide adequate services to clusters of higher density development removed from existing urban areas.
- Clusters must be kept small in order to avoid becoming an urban foothold that attracts additional development.



*Mitigation fees* are paid by a developer of agricultural land as a condition of obtaining subdivision approval or to mitigate various environmental impacts. The fees would be used for the permanent preservation of agricultural land to mitigate the loss of the land that is developed.

**Advantages of Mitigation Fees:**

- New development pays to mitigate its impact on the environment.
- The funds collected can be used to permanently preserve the most important agricultural land.
- The fees could be a significant source of funding for acquisition of fee-title or agricultural easements.
- Mitigation fees can be used in conjunction with other preservation programs.

**Disadvantages of Mitigation Fees:**

- Fees can be used only for acquisitions that benefit or bear a relationship to the development from which the fees were collected.
- Developers tend to add the fees to the price of the new homes, resulting in higher housing costs.

*Overlay Zones* place special development restrictions, in addition to the requirements of the underlying zoning, on areas of special value such as scenic corridors, prime farm land or environmentally sensitive areas. Restrictions may include mandatory clustering, performance standards, or design review requirements.

**Advantages of Overlay Zones:**

- The zoning ordinance can be adapted to the special needs of sensitive areas.

**Disadvantages of Overlay Zones:**

- Zoning designations are not permanent and can be changed.
- The language in the zoning ordinance must be specific enough to avoid varying interpretations.

**Minimum Parcel Size**

The issue of minimum parcel sizes in agricultural areas is highly controversial. Farm size has an important relationship to agricultural economics. Smaller farms generally have higher production costs per unit of output, and many commodities need a relatively large-sized farm for economic viability. Also, the interspersal of parcels too small for agricultural use can disrupt agricultural operations both by causing land use conflicts and by reducing the agricultural base needed to justify agricultural support services.

Certain agricultural products or activities, such as poultry, horse farms and very high value specialty crops, may be suitable for smaller acreage farms and the cost of buying, improving and maintaining large acreage is prohibitive for such intensive activities. However, smaller parcels have less flexibility. While intensive, high-value agriculture can occur on large parcels, sometimes in conjunction with other agriculture, most crops and grazing activities are not viable

on small parcels. Thus, in the event that market conditions or a landowners' personal desires change, the only option for small parcels may be rural residential or rural estate use.

With the exception of highly productive lands, such as vineyards, a very large percentage of the market price of agricultural land can be in its value as a residential building site. This suggests that a smaller, subdivided parcel is likely to be only slightly less expensive for agricultural use than a larger parcel. A perceived trend toward smaller parcels may accelerate speculative price increases. Unless clustered in distinct districts, small acreage parcels can interfere with large-scale agricultural operations. Also, within the Livermore-Amador Valley groundwater basin, there are concerns that parcels under 20 acres may cumulatively reduce groundwater quality due to septic systems.

Minimum parcel size has been an issue throughout California. Many counties recognize two or more agricultural classes. Typically, more intensive cropland has a minimum parcel size of 20, 40 or 80 acres. Minimum parcel sizes for grazing land range from 160 to 640 acres. Santa Clara County's minimum parcel size requirements range from 20 to 160 acres. San Luis Obispo County has a 20 acre minimum parcel size requirement for row crops, 160 acre minimum parcel size for dry farming, and 320 acre minimum parcel size for grazing land. Solano County defines "farmable units" as 40 acres for orchard and vineyard lands, 80 acres for irrigated land and 160 acres for non-irrigated land. Forty acres is the current minimum for vineyards in Napa County. As a result of a ballot measure in Contra Costa County approved in a countywide vote, many agricultural areas there are now subject to 320 acre minimum parcel sizes. San Mateo County uses a sliding scale to determine density in agricultural areas.

Although ranchers require large areas of rangeland to maintain profitable grazing operations, minimum parcel sizes can be somewhat smaller than the size required, so long as they are not so small as to unduly complicate leasing arrangements.

## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Preservation of valuable agricultural soils to maintain productivity*
- *Protection of agricultural operations from the encroachment of incompatible land uses*
- *Assurance of the availability of agricultural support services and facilities*
- *Support of commercial uses that enhance agriculture*
- *Provision of economic incentives to encourage continuing agricultural operations*
- *Discouragement of the cancellation of Williamson Act contracts*

- *Establishment of a long-term commitment to agriculture by adopting programs to ensure the preservation of agricultural land outside of the urban limit line*
- *Maintenance of parcel sizes sufficient to attract and retain commercial agricultural operations*
- *Prevention of the premature development of agricultural land within the urban limit line in order to encourage rational and timely development*



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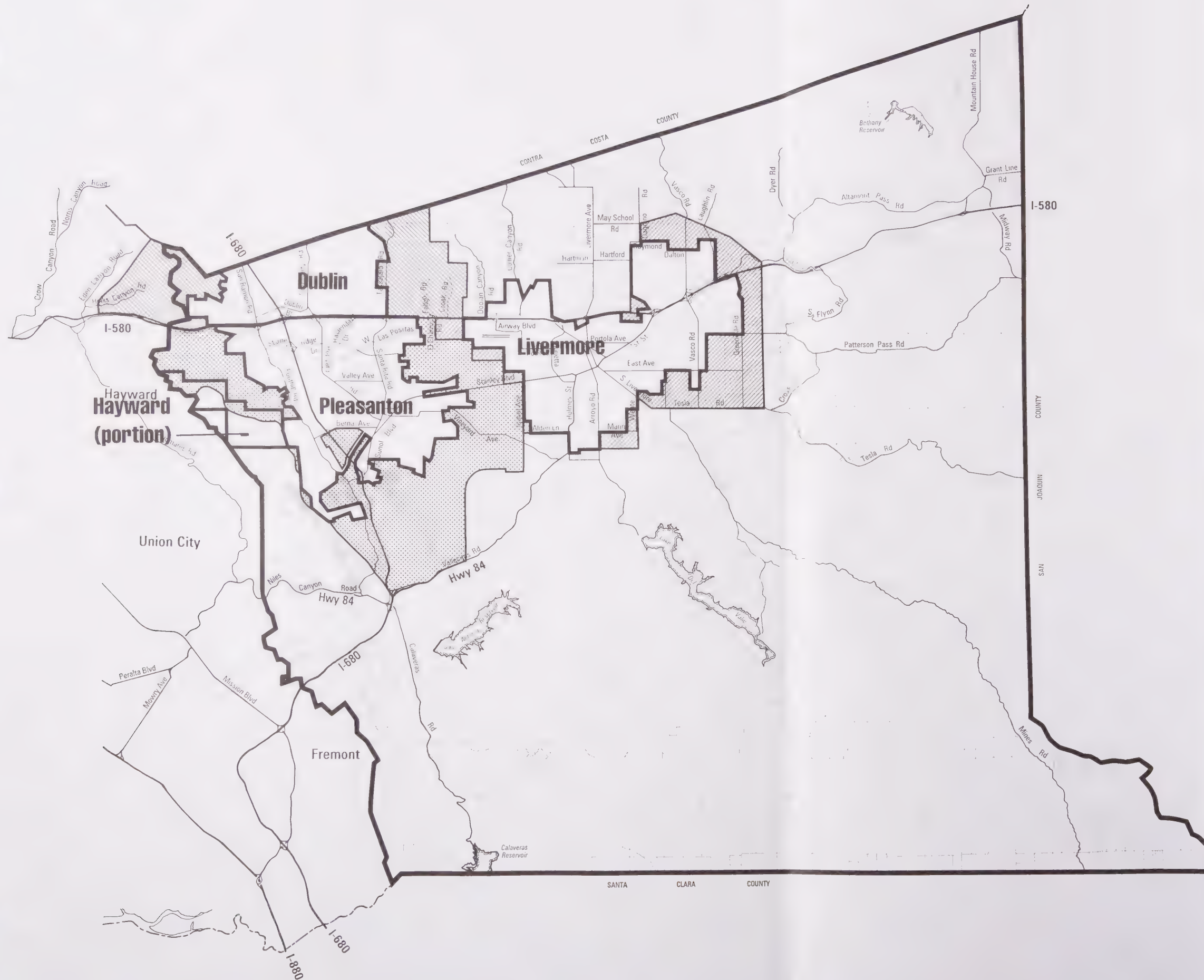
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# City Limits & Spheres of Influence

## LEGEND

-  City of Dublin Sphere of Influence (SOI)
-  City of Pleasanton SOI
-  City of Livermore SOI
-  Incorporated Cities



SOURCE: Alameda County Planning Department

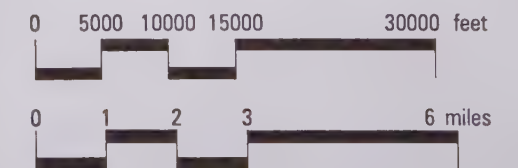


FIG. 3







# Updated City Limits for the East County Planning Area

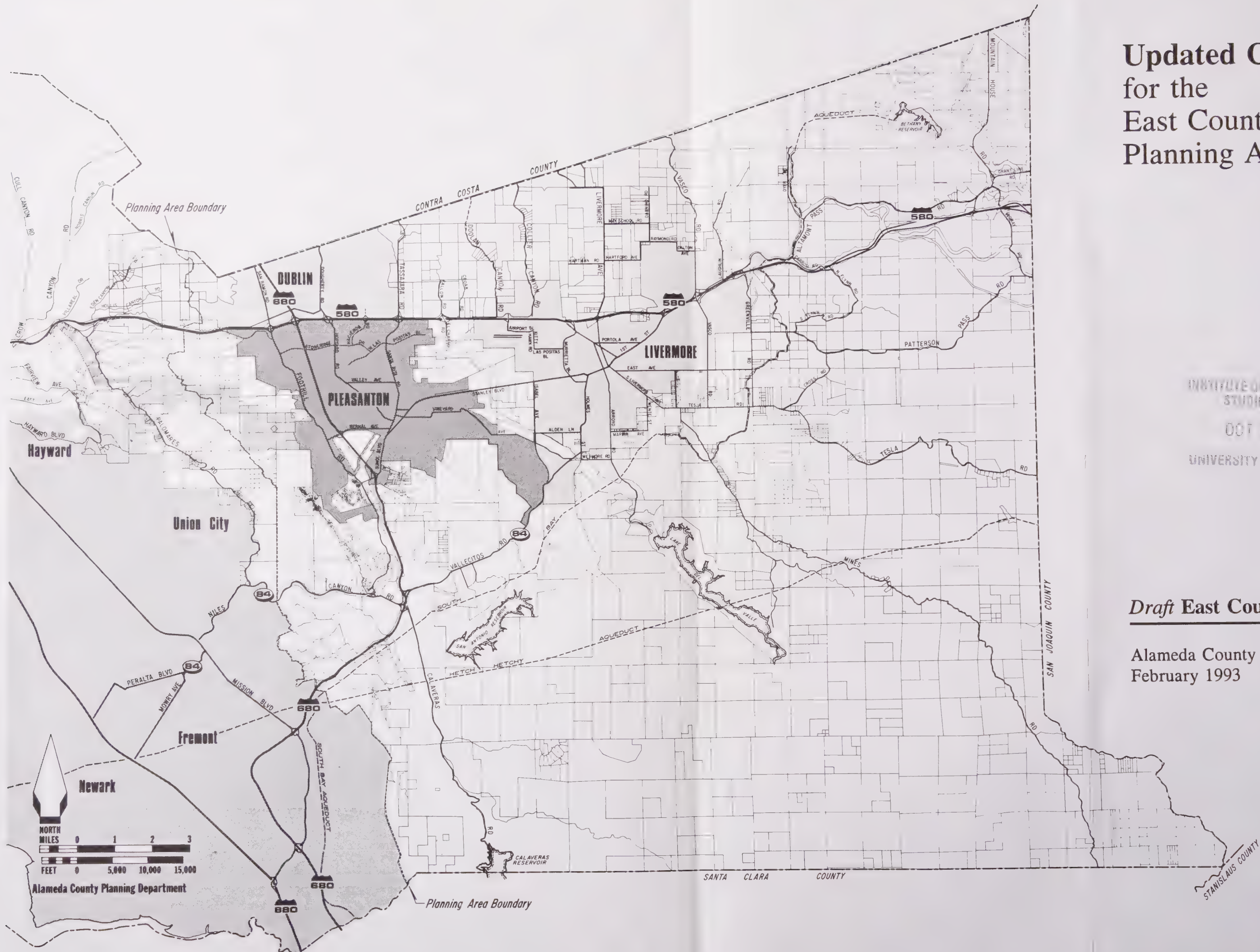
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## Draft East County Area Plan

Alameda County Planning Department  
February 1993






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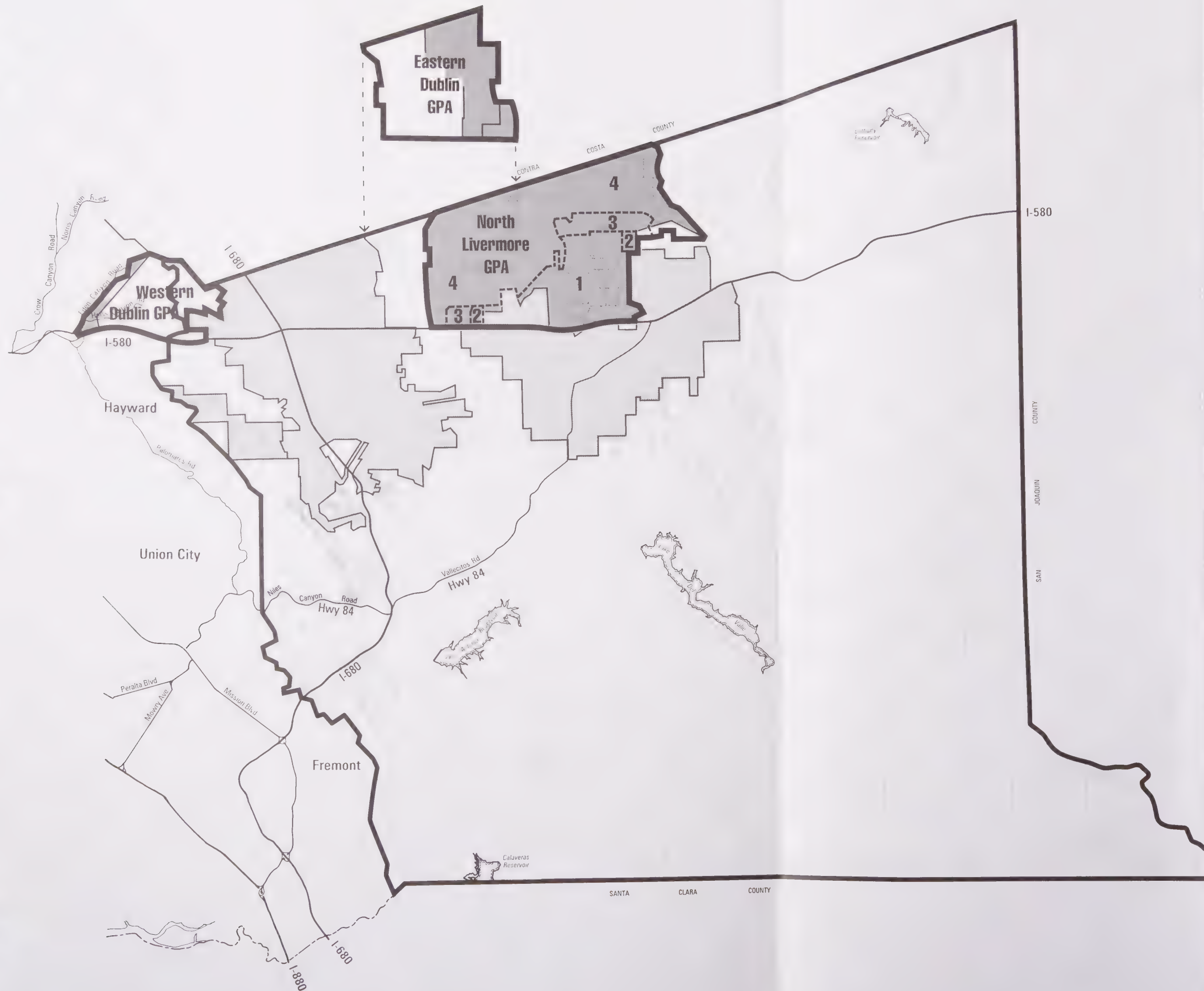


# Proposed City General Plan Amendments, 1992

## LEGEND

-  General Plan Amendment (GPA) Areas Within Existing Spheres of Influence (SOI)
-  GPA Areas Outside of Existing SOI
-  Incorporated Cities

**NOTE:** For North Livermore GPA,  
 Alternative 1 - population 10,000  
 Alternative 2 - population 20,000  
 Alternative 3 - population 30,000  
 Alternative 4 - population 45,000 (includes hillside protection plan)  
 A small portion of the GPA area is within existing Livermore City Limits.  
 Numbers on the map correspond with the number of the alternative.  
 Each alternative's area includes the area(s) of the preceding alternative(s).



SOURCE: Alameda County, City of Livermore, City of Dublin Planning Departments.

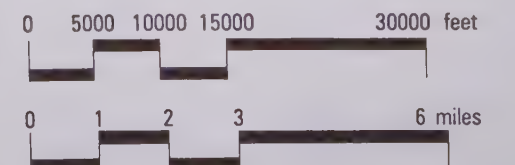


FIG. 4



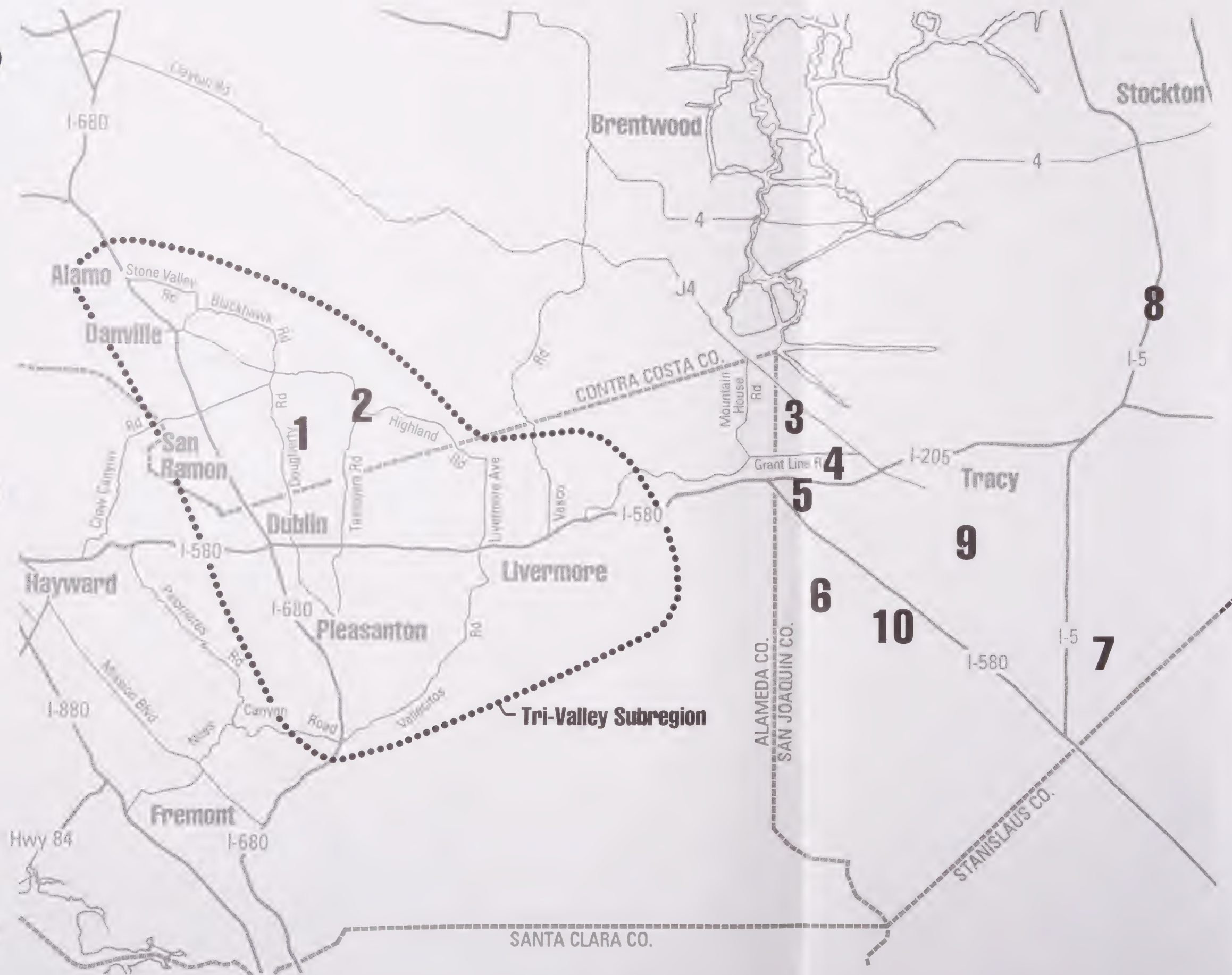




# Major Land Use Proposals in Vicinity

## LEGEND

1. Dougherty Valley GPA and Specific Plan
2. Tassajara Valley GPA
3. Mountain House GPA
4. Tracy Station
5. Tri-State Cheng GPA
6. Tracy Highlands/Le Boeuf
7. New Jerusalem Expanded Community
8. City of Lathrop GP
9. City of Tracy Urban Management Plan
10. Tracy Hills



SOURCE: Contra Costa and San Joaquin County Planning Departments

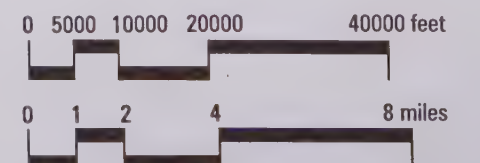


FIG. 5








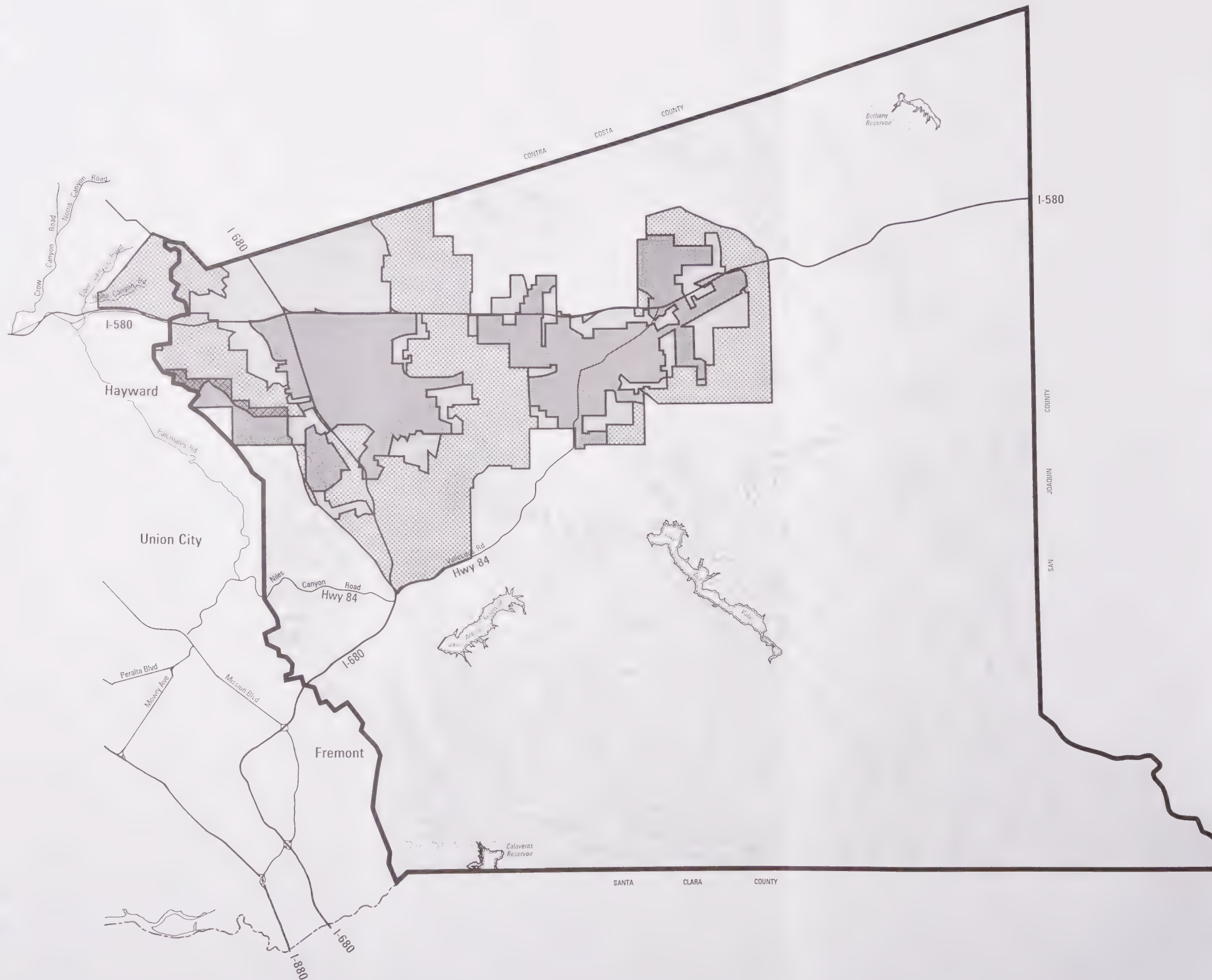


# Urban Expansion

## LEGEND

-  1980 City Limits
-  1992 City Limits
-  City Spheres of Influence, 1992

**NOTE:** No distinctions are made on this map between the City Limits and Spheres of Influence of Dublin, Hayward, Livermore and Pleasanton



SOURCE: Alameda County Planning Department

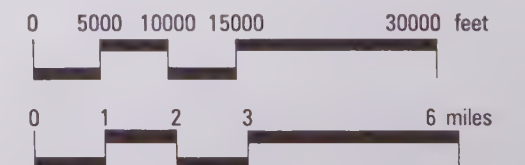






FIG. 6





# Non-Urban Land Use

## LEGEND

-  Rural Residential Clusters (without urban services)
-  Construction Aggregate Quarries
-  Sanitary Landfills
-  Wind Farms

**NOTE:** Watershed lands and regional parks are shown on "Major Park Facilities and Regional Trails". Locations on this diagram are approximate and sites are not shown to scale.



SOURCE: Alameda County Planning Department

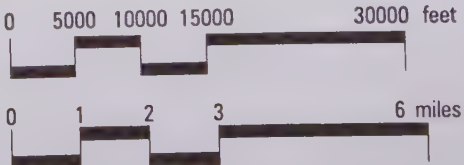


FIG. 7









# Prime Soils

## LEGEND

-  Class I & II Soils within 1992 City Boundaries
-  Class I & II Soils in Unincorporated Areas

NOTE: Map does not reflect current land use.



SOURCE: Soil Survey, U.S. Department of Agriculture, Soil Conservation Service, 1961

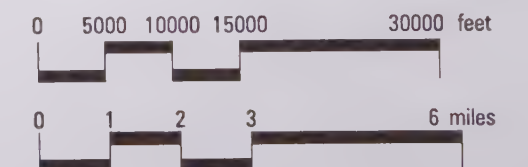


FIG. 8



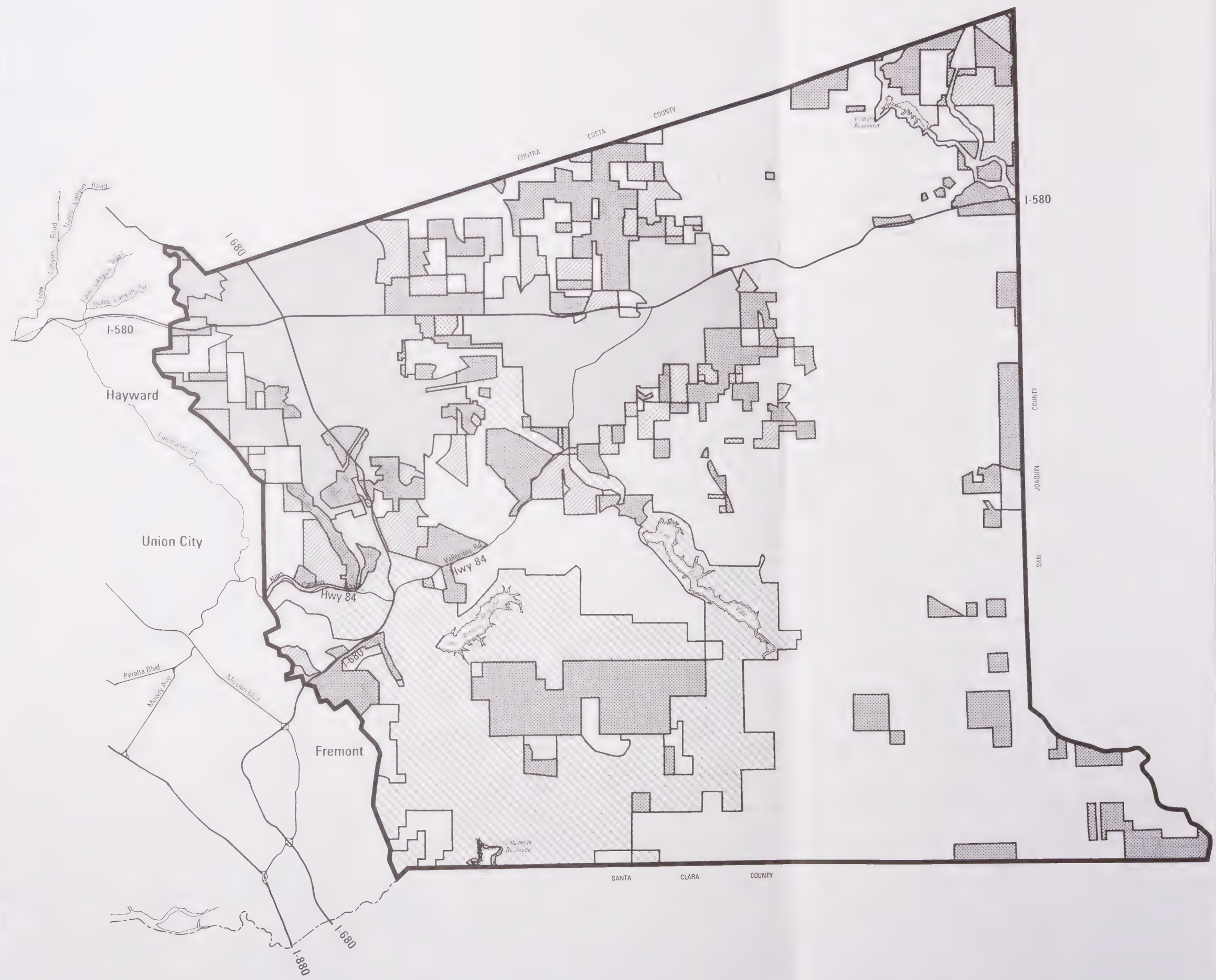




# Williamson Act Status, Feb. 1991

LEGEND

- Never Under Contract
- Contract Cancelled/Non-Renewed (expired)
- Under Contract, Filed for Non-Renewal (up to 10 years for contract to expire)
- Under Contract, Renewing
- Other Protected Lands
- Incorporated Cities (Hayward City Limits not shown in order to convey renewing Williamson Act contracts)



SOURCE: Alameda County Planning Department, Feb. 1991.

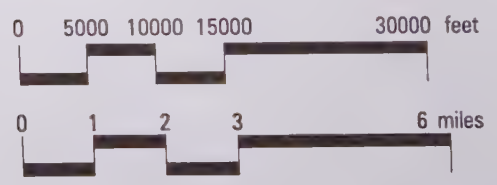


FIG. 9



## Section B. Population and Socio-Economic Conditions





## **Population and Employment Growth**

### **■ INTRODUCTION**

Population and employment growth is one of the major driving forces behind land use planning. Macroeconomic forces at the national and state level affect regional and local conditions including population, employment, household size, and income levels which in turn affect how and where land is utilized. Projected changes in population, housing and employment in the East County and the Tri-Valley are discussed in this report. The Tri-Valley consists of the East County's Livermore-Amador Valleys (in which the cities of Dublin, Pleasanton and Livermore are located) plus San Ramon Valley which is located in Contra Costa County and site of the cities of San Ramon and Danville. Contra Costa's Alamo/Blackhawk developments and the proposed Dougherty Valley and Tassajara Valley General Plan Amendments are also located in the Tri-Valley subregion. Refer to Figure 5.

### **■ EXISTING CONDITIONS**

Existing population, employment and housing data for the planning area are shown in Table B-1. (For purposes of this background report, "existing" conditions represent the year 1990, the most recent year for which there is reliable and extensive data.)

#### **Population and Housing**

The East County's three incorporated cities comprise 96 percent of the planning area's population of 135,589. Livermore has the largest population (56,741), followed by Pleasanton (50,553) and Dublin (23,229) with only minimal population in unincorporated areas (5,066). This represents a 34 percent increase in population since 1980 when the population was 101,113.

The distribution of housing units and households reflects that of the population. Livermore has the largest number of housing units (21,489), followed by Pleasanton (19,356) and Dublin (6,992), with only a minimal number of units in unincorporated areas (1,913). Housing units total 49,750 of which 47,765 are occupied representing an average 4 percent vacancy rate. Household size varies only slightly among the jurisdictions with an average of 2.75 persons per household.

#### **Employment**

The three cities and their spheres of influence constitute virtually 100 percent of the 69,180 total East County jobs (see Figure 3). Pleasanton has the largest employment (31,930), followed by Livermore (23,770) and Dublin (13,380), with only minimal, farm-related employment in unincorporated areas outside of sphere of influence boundaries (100). Of this total the East County employment, ABAG estimates that about 1 percent is due to agriculture, 19 percent to

manufacturing and wholesale, 23 percent to retail, 30 percent to service, and 27 percent to other types of employment.

<p><b>TABLE B-1</b></p> <p><b>East County Population, Employment, and Housing Conditions - 1990</b></p>					
<b>Area (Acres)</b>	<b>Population/ Employment</b>	<b>Housing Units</b>	<b>Households</b>	<b>% Vacant</b>	<b>Persons per Household</b>
<b>Dublin (5,481)</b>	23,229 13,380	6,992	6,802	2.7%	2.86
<b>Livermore (12,565)</b>	56,741 23,770	21,489	20,643	3.9%	2.74
<b>Pleasanton (10,375)</b>	50,553 31,930	19,356	18,484	4.5%	2.73
<b>Remainder East Co. (239,079)</b>	5,066 100	1,913	1,836	4.0%	2.76
<b>Total East County (267,500)</b>	<b>135,589 69,180</b>	<b>49,750</b>	<b>47,765</b>	<b>4.0%</b>	<b>2.75</b>
<p><b>Note:</b> The 1990 Census is the most reliable indication of existing population and housing conditions in the East County. Because 1990 Census Journey-To-Work information is not yet published, employment data is derived from ABAG's most recent estimates. Both sources aggregate data at the city level and publish information for Dublin, Livermore, and Pleasanton. Population, housing, and acreage data includes incorporated areas only as derived from the U.S. Census of Population and Housing; employment data includes city spheres-of-influence as derived from ABAG.</p> <p><b>Sources:</b> U.S. Census of Population and Housing, <u>Summary Tape File 1</u>, 1992; ABAG, <u>Projections 92</u>, July 1992 for "area in acres" data.</p>					

### Population by Race and Hispanic Origin

As shown in Table B-2, the existing population of the East County is 83 percent white, 9 percent hispanic, 5 percent asian, and 3 percent black.



TABLE B-2

**East County Population by Race and Hispanic Origin - 1990**

Area	Percent Hispanic	Percent White	Percent Black	Percent Asian	Percent Other	Total Percent
Dublin	10%	72%	11%	6%	1%	100%
Livermore	10%	84%	1%	4%	1%	100%
Pleasanton	7%	86%	1%	5%	< 1%	100%
Remainder East Co.	9%	88%	< 1%	2%	1%	100%
<b>Total East County</b>	<b>9%</b>	<b>83%</b>	<b>3%</b>	<b>5%</b>	<b>1%</b>	<b>100%</b>

Source: Public Law 94-171 Reapportionment Data Release, 1990 Census of Population, U.S. Department of Commerce

**Forecast Methodology**

The Association of Bay Area Governments (ABAG) issues population, housing, and employment data for each city and county in the San Francisco Bay Area every two years, with forecast data provided for subregional areas such as the Tri-Valley. The most recent ABAG forecasts are contained in Projections 92 which was released in July of 1992.

Projections 92 uses the 1980 U.S. Census for historical data and 1990 Census data as a benchmark for existing demographic information. Forecasts are generated in 5 year increments to the year 2010 based on national and state economic forecasts, development plans of local jurisdictions, and various demographic assumptions contained in ABAG's regional modelling system. The regional model forecasts growth and investment requirements for several industry sectors such as agriculture, manufacturing, retail, and services. This growth generates demand for labor (number of employees) and housing for that labor (housing units and households). The model takes into account the competitiveness of the Bay Region in terms of technology, birth and death rates, regional migration, and housing production. A detailed explanation of the modeling techniques and results is contained in the ABAG document.

Alameda County retained the economic consulting firm, Economic and Planning Systems (EPS), to disaggregate ABAG's subregional projections for the Tri-Valley into the East County and Contra Costa portions of the Tri-Valley and into the individual subareas. The EPS forecasts are essentially consistent with the ABAG forecasts although there are minor variations at the subarea level due to differing data collection methods, e.g. ABAG's projections include each city's sphere of influence while EPS further refines this information (by disaggregating data by traffic zones) in order to distinguish between development projected within existing city limits and

proposed General Plan Amendment subareas such as North Livermore, East Dublin, and Pleasanton Ridge. Figure 10 shows the demographic and traffic data study zones used by EPS. Refer to Appendix 4 for a more detailed explanation of data sources. A comparison of ABAG and EPS projections is shown in Appendix 4, Table G-1.

### Growth Projections for 2010

The following table shows growth projections for the East County for 2010.

TABLE B-3				
East County Growth Projections - 2010				
Area	Jobs/Housing			Population
	Jobs (Number)	Housing Units (Number)	Jobs/Housing Ratio	
Dublin	12,758	6,692	1.27	17,801
East Dublin	11,562	10,723	0.72	28,523
West Dublin	291	2,999	0.06	7,977
Pleasanton	58,186	30,035	1.30	79,892
Pleasanton Ridge	50	2,658	0.01	7,070
Livermore	56,393	27,243	1.38	72,466
North Livermore	4,666	13,751	0.23	36,577
South Livermore	4,055	2,820	0.96	7,501
Unincorporated (Remainder)	100	470	0.14	1,250
Totals:	148,061	97,391	1.01	259,057
<p><b>Note:</b> ABAG projections do not differentiate between the existing incorporated city and its sphere of influence (e.g. Dublin) and the proposed General Plan Amendment subareas (e.g. East Dublin) which are targeted for major development over the next 20 years. Nor does ABAG project past the year 2010. To enable a more locally sensitive analysis of the area, Economic and Planning Systems (EPS) disaggregated the ABAG data to differentiate between existing cities and developing areas.</p> <p><b>Source:</b> ABAG Revised Projections 90 as disaggregated by EPS assumes 5 percent vacancy rate, 2.8 persons per household, and 1.58 workers per household.  <math>J/H = J/(DU \times .95 \times 1.58)</math>.</p>				

**Existing General Plans and Proposed General Plan Amendments**

Buildout of the East County's three existing city General Plans would result in about 179,000 jobs and generate about 61,000 households and a population of 171,000. A number of General Plan Amendments are being proposed for the cities of Dublin (Eastern Dublin and Western Dublin) and Livermore (North Livermore) and the County (South Livermore). (Although the City of Pleasanton's Pleasanton Ridge proposal was denied approval in June of this year, it was too late to remove it from the forecast analyses used in this background report.) If all existing General Plans and proposed General Plan Amendments were implemented in the Tri-Valley subregion (i.e. including the Contra Costa County portion), the existing population would grow from 223,000 to 435,000 and the employment base would grow from 112,000 jobs to 279,000 at buildout. Under this composite "Prospective General Plans" scenario, the East County is projected to grow from a population of 136,000 and an employment base of 76,000 to a population of 290,000 and an employment base of 223,000 at buildout. Existing and buildout populations, households, and employment for the individual subareas of the Tri-Valley subregion are shown in Table B-4 (East County) and Table B-5 (Contra Costa County portion). Proposed General Plan Amendment subareas are graphically depicted in Figure 4. At projected growth rates, buildout of the "Prospective General Plans" scenario would occur sometime after the year 2010, possibly within 30 to 40 years.



TABLE B-4

**Households, Population and Jobs of Prospective General Plans  
(East County) - 1990 and Buildout**

City/City GPA SubAreas	Year 1990		Buildout	
	Households/ Population	Jobs	Households/ Population	Jobs
<b>*Dublin<sup>1</sup></b>	6,192 17,523	12,451	6,358 17,802	12,758
<b>East Dublin<sup>2</sup></b>	50 141	455	17,549 49,138	25,715
<b>West Dublin<sup>3</sup></b>	849 2,402	291	3,945 11,046	291
<b>*Livermore<sup>4</sup></b>	20,633 58,391	30,504	25,881 72,466	101,545
<b>North Livermore<sup>5</sup></b>	131 370	336	15,704 43,972	13,792
<b>South Livermore<sup>6</sup></b>	163 461	3,833	2,679 7,501	4,055
<b>*Pleasanton<sup>7</sup></b>	19,724 55,818	28,363	28,552 79,943	64,568
<b>Pleasanton Ridge<sup>8</sup></b>	17 48	0	2,525 7,070	50
<b>*Remainder<sup>9</sup> Unincorporated</b>	285 806	100	446 1,248	100
<b>Total East County</b>	<b>48,044 135,960</b>	<b>76,333</b>	<b>103,639 290,186</b>	<b>222,874</b>
<b>Total Tri-Valley</b>	<b>78,392 223,282</b>	<b>111,651</b>	<b>155,461 435,285</b>	<b>279,123</b>

**Note:** Because of an overlap between the East Dublin and North Livermore plans, the composite holding capacity assumes a scenario which divides the two plans along a line just east of Collier Canyon Road following the East Dublin eastern boundary to the Livermore City Limits and then proceeding westward to Doolan Canyon Road and southward to I-580. This division yields the maximum amount of development provided between the two plans while respecting land currently within Livermore's City limits. The \* denotes existing general plans. Assume 2.83 persons per household for 1990 and 2.8 persons per household for 2010 and buildout.

<sup>1</sup>Source: City of Dublin, Dublin General Plan, Adopted February 11, 1985, based on EPS interpretation of the Dublin General Plan, Adopted February 11, 1985.

<sup>2</sup>Source: City of Dublin, East Dublin General Plan Amendment (Draft), February 1992, based on East Dublin General Plan Amendment (as of February 1992), which yields 18,473 housing units and 27,925 jobs, modified to delete 120 acres of Industrial Park east of Doolan Canyon Road at densities assumed in the Draft East Dublin General Plan Amendment yielding 2,210 fewer jobs (1,304,400 s.f. at 1 job per 590 s.f.).

<sup>3</sup>Source: City of Dublin, West Dublin Specific Plan EIR, January 1992, based on 3,260 units cited in West Dublin EIR plus EPS estimate of 872 existing units and 291 existing jobs.

<sup>4</sup>Source: City of Livermore, Livermore General Plan, as amended to November 14, 1988, based on EPS interpretation of Livermore General Plan, as amended to November 14, 1988; holding capacity based on 2010 Livermore Circulation Element Scenario, December 1988.

<sup>5</sup>Source: City of Livermore, North Livermore 45,000 Population Plan, January 30, 1992; North Valley Plan, based on North Livermore 45,000 Population Plan which yields 16,513 housing units and 22,111 jobs, modified to delete 200 acres of Business Commercial Park (BCP) (2,613,600 sf / 325 = 8,041 jobs) and 20 acres of Commercial (174,240 sf / 625 = 278 jobs) land lying west of Doolan Canyon Road at North Livermore GPA EIR assumed densities yielding 8,319 fewer jobs.

<sup>6</sup>Source: Alameda County, South Livermore Valley Area Plan, February 6, 1992, based on high estimate shown in South Livermore Valley Area Plan and assumes 100,000 square feet of vineyard-related commercial development at an average employment density for commercial uses of 1 job per 450 square feet (222 jobs) plus 3,833 existing jobs.

<sup>7</sup>Source: City of Pleasanton, Pleasanton General Plan, as amended to 1992, based on EPS interpretation of the Pleasanton General Plan, as amended to 1992.

<sup>8</sup>Source: City of Pleasanton, Pleasanton Ridgeland Plan, January 10, 1992, based on maximum holding capacity of 2,640 units cited in Pleasanton Ridgeland Plan plus 18 existing units; job holding capacity based on EPS.

<sup>9</sup>Source: Alameda County, Livermore-Amador Valley Planning Unit General Plan, 1977 East County totals 267,500 acres of which about 98,000 acres are included within other subareas; of the remaining 169,500 acres, it is assumed that about 90% are unbuildable due to access, infrastructure, slope, public ownership, or other constraints. The potentially buildable 16,950 acres could yield 170 housing units in addition to the 300 existing units in unincorporated areas outside subareas (According to the 1990 census, there are 90 units on Tesla Road, 70 in Mountain House area, 40 in Niles Canyon, 30 on Greenville Road, 50 on Mines Road, and 20 on Vallecitos Road.) Assumes 100 existing agricultural jobs in unincorporated areas, estimated by County Agricultural Commissioner.

**Source:** Buildout of Existing General Plans Sources: Unless otherwise noted, holding capacity estimates are derived from the following source: Economic and Planning Systems (EPS), Alameda County General Plans: Land Use and Jobs/Housing Analysis, July 1992. Holding capacity estimates used by EPS were derived from the following sources and disaggregated into subareas. Subareas are defined by Tri-Valley Traffic Zones developed for the Tri-Valley Transportation model (see Figure 10) and may not conform to city General Plan and General Plan Amendment boundaries.

TABLE B-5

**Households, Population and Jobs for 1990  
and Buildout of Prospective General Plans  
(Contra Costa County Portion of Tri-Valley) - 1990 and 2010**

Subarea	Existing (1990)		Buildout	
	Households/ Population	Jobs	Households/ Population	Jobs
<b>Danville</b>	10,999 31,127	6,005	13,223 37,024	7,705
<b>San Ramon</b>	13,171 37,273	27,679	15,880 44,464	45,310
<b>Alamo/Blackhawk</b>	6,209 17,571	1,623	8,466 23,704	1,623
<b>Dougherty Valley</b>	101 285	0	9,601 26,882	1,500
<b>Tassajara Valley</b>	69 195	12	4,344 12,163	12
<b>Other Unincorporated Contra Costa County</b>	308 871	99	308 862	99
<b>Total Contra Costa County</b>	30,857 87,322	35,418	51,822 145,099	56,249
<b>Total Tri-Valley</b>	78,392 223,282	111,651	155,461 435,285	279,123

**Notes:**

Subareas are defined by Tri-Valley Traffic Zones (see Figure 10) and may not conform to city General Plan and General Plan Amendment areas.

Assumes 2.83 persons per household in 1990 and 2.8 in 2010 and buildout for Tri-Valley, per ABAG Preliminary Projections 92, March 1992.

Assumes a 5% vacancy rate.

Variations in household size and vacancy rates among subareas may affect population estimates; totals may not match ABAG 1990 estimates due to differing data collection procedures.

**Source:**

Economic and Planning Systems, Tri-Valley Employment Related Housing Demand Report, May 1992 as formatted by the Alameda County Planning Department.



## ■ TRENDS

### **Continued Decline in the Rate of Growth for the San Francisco Bay Region**

Between 1960 and 1980, the population of the nine county Bay Region expanded at an average annual growth rate of 2.2 percent. From 1980 to 1990, the annual rate of regional population growth decreased to 1.6 percent. From 1990 to 2010, the regional population growth rate is projected to further decrease to 1.1 percent annually. Between 1960 and 1980, employment (i.e., the number of jobs) in the Bay Region increased at an average rate of 3.8 percent per year. From 1980 to 1990 the rate of regional employment growth decreased to 1.9 percent. From 1990 to 2010, regional employment growth rate is projected to further decrease to 1.6 percent annually. Population and employment growth rates in Alameda County generally reflect regional trends, although data is not available by county for the period between 1960 and 1980. Although the employment growth rate is projected to exceed the population growth rate, the number of new workers entering the workforce from in-migration will outpace the number of jobs available to workers and reflects a slowdown in the regional economy.

### **Shift in Type of Regional Economic Growth from a Manufacturing Base to a Service Industry**

As manufacturing activity, such as ship-building and steel, has shifted to the high-tech electronics industries, the Bay Area economy has become more dependent on service industries. (Oakland, for example, once a hub of manufacturing activity, has continued to lose jobs throughout the 1980s.) Many service jobs, however, pay low salaries and offer very little opportunity for advancement or job security. The continued reduction of the earning power of Bay Area workers will continue to result in decreased retail spending and decreased tax revenues per capita to local governments.

### **Shift in Location of Regional Growth to East County and Other Outlying Areas**

The economy of the Bay Area has become increasingly affected by what occurs in the region's suburbs and adjacent counties. In the past 10 years, there has been a rapid decentralization of employment away from traditional job centers to outlying locations, including the Tri-Valley area. This shift in the location of employment and population growth conforms to an emerging new urban form whereby suburban "edge cities" have replaced the suburban bedroom communities which formerly surrounded the traditional central urban core.

The population of the East County has grown rapidly during the last thirty years, increasing over 360 percent since 1960. The Tri-Valley area was transformed from a bedroom community in the 1970s to a regional employment center during the rapid employment growth of the 1980s. Between 1980 and 1990, the Tri-Valley gained more than 19,000 jobs alone from the construction of the Bishop Ranch and Hacienda Business Parks. Over the next 15 or 20 years, ABAG projects a continued shift in the distribution of employment from Alameda County's Bay cities to the Tri-Valley cities. Although the rate of employment growth for the Tri-Valley subregion is expected to be lower in the next twenty-year period (5.9 percent) than it was in the

1980s (10.3 percent), it will still be higher than that projected for the Bay region as a whole (1.6 percent). ABAG projections also show an increase in the rate of household and population formation in the East County from 4.3 percent annually in the 1980s to 5.2 percent between 1990 and 2010. The demand for housing has been intensified by the combined effects of the decreasing household size and the rapidly increasing population. As a result, the number of households has increased at a faster rate than the population. ABAG projections indicate that this trend will level off, with the number of households in the planning unit increasing by an estimated 104 percent between 1990 and 2010.

A 1991 survey of 48 businesses in the Tri-Valley area found that the cost and availability of raw land, the availability of existing leasable building space and the presence of a labor market (followed by political climate and proximity to the consumer) were the most important reasons for businesses choosing their business locations in the Tri-Valley rather than in one of the Bay cities. Regardless of this trend, the Bay cities are still projected to have over two-thirds of the total employment in Alameda County. However, all Alameda County Bay cities lack sufficient available raw land while Oakland also lacks back office building space and social support systems (such as child care, job counseling, drug rehabilitation) necessary to attract many businesses. This implies that the Tri-Valley is the business location of choice and that therefore there is little direct competition between Tri-Valley and Bay cities.

Growth has also shifted into adjacent counties. The nine-county San Francisco Bay region represented by ABAG has expanded into San Joaquin, Santa Cruz, and San Benito Counties, particularly because of more affordable housing opportunities in these outlying areas. Unlike Alameda County and the rest of the Bay region, population growth in San Joaquin County is projected to increase to an average annual growth rate of 2.8 percent from 1990 to 2010. Employment growth is projected to increase to an average annual growth rate of 2.7 percent over the same period. Although not included in ABAG's projections, growth in San Joaquin County is tied to that in Alameda County and the Bay Area because of the large amount of commuting over the Altamont Pass.

The total increase in population, households, and employment for the Bay Region, Alameda County, and San Joaquin County from 1990 to 2010 is shown in Table B-6 below.



TABLE B-6

**Households, Population and Job Projections for the Bay Region,  
Alameda County, Tri-Valley, East County  
and San Joaquin County - 1990 and 2010**

Area	Year 1990		Year 2010	
	Households/ Population	Jobs	Households/ Population	Jobs
<b>Bay Region<sup>1</sup></b>	2,246,242 6,023,577	3,114,440	2,802,050 7,508,450	4,128,080
<b>Alameda County<sup>2</sup></b>	479,518 1,279,182	622,230	583,670 1,557,200	830,710
<b>Tri-Valley<sup>3</sup></b>	77,618 220,060	109,150	133,730 369,600	217,150
<b>East County<sup>4</sup></b>	46,990 133,154	69,080	89,820 250,700	151,560
<b>San Joaquin County<sup>5</sup></b>	160,914 465,042	182,237	266,155 745,235	284,651

**Footnotes:** <sup>1</sup>Bay Region includes all nine Bay Area Counties.

<sup>2</sup>Alameda County includes 14 cities plus unincorporated areas.

<sup>3</sup>Tri-Valley includes Danville, San Ramon, and Blackhawk/Alamo Spheres-of-Influence in Contra Costa County (excluding the Tassajara Valley and Dougherty Valley portions of East Contra Costa County which were not available by census tract at the time of publication); and the Dublin, Livermore, and Pleasanton spheres of influence in Alameda County.

<sup>4</sup>East County includes the Dublin, Livermore, and Pleasanton Spheres-of-Influence in Alameda County.

<sup>5</sup>San Joaquin County, Adopted General Plan 2010, 1992 (Alternative 2: Baseline=727,519 population and 282,431 jobs plus 17,716 population and 2200 jobs within New Jerusalem and Riverbrook new towns. 1990 household estimated from population assuming 2.89 persons per household. 2010 households estimated from population assuming 2.8 persons per household.

**Source:** ABAG, Projections 92, July 1992



## ■ PLANNING ISSUES

### Growth

Major population and employment growth is planned and projected for the East County. Projected growth for 2010 will come close to doubling the current population. Planned growth under the "Prospective General Plans" scenario (existing general plans plus general plan amendments) would increase the East County's population by 154,000 (from 136,000 to 290,000 people) and employment by 147,000 (from 76,000 to 223,000 jobs). Attaining this planned employment growth at any time in the future is highly unlikely due to highway infrastructure constraints coupled with a jobs/housing imbalance implicit in the existing and prospective general plans. Given the surplus of employment potential in comparison to housing under the prospective general plans, workers would need to incommute to the East County; highway capacity constraints, however, would restrict the number of incommuters resulting in unrealized employment of nearly 40,000 jobs. This suggests that too much land is being designated for employment generating uses. (Commute constraints and the jobs/housing issue are discussed in detail in the *Jobs and Housing* background report.)

If planned population growth is to be accommodated, policies will be needed to address the impacts of this growth on the East County's resources, services and infrastructure (refer to the background reports which cover these topics).

### Growth in Contra Costa and San Joaquin Counties

The projected supply of housing, especially low and moderate income housing, in San Joaquin and Contra Costa Counties will continue to attract Tri-Valley and East County workers and will result in increased commuting into Tri-Valley employment areas, especially along the I-580 corridor (from Tracy and Manteca) and the I-680 corridor (from Pittsburg, Antioch, and Brentwood). The projected rates of growth in San Joaquin County will be influenced in part by development policies in Alameda and Contra Costa County. Development of housing in the Tri-Valley, for example, at price ranges competitive with those in San Joaquin County would tend to displace demand for housing east of the Altamont Pass. A certain amount of growth projected by ABAG may overlap that projected within San Joaquin County. Better coordination between the two regions will be needed in the future to address this potential overlap. (The housing affordability issue is discussed in detail in the *Jobs and Housing* background report.)

### Funding of Services and Infrastructure

The projected reduction of the earning power of Bay Area workers, combined with the decreasing rate of employment growth in the Tri-Valley and East County areas, will result in decreased retail sales and commercial property tax revenues per capita to local governments, exacerbating the shortfall between revenue supply and the demand for public facilities, infrastructure, and services. Additional development fees will be required to supplement tax revenue in the future.

## **Economic Development**

The analysis of regional economic linkages poses several issues which affect land use planning in the Tri-Valley subregion and the East County area. These issues can be summarized as follows:

- The growth in service businesses is the driving force behind economic development in the Bay Region and Alameda County.
- Continued investment in telecommunications and other technical infrastructure will be required for communities to remain competitive in attracting service businesses in the future.
- The service economy is dependent on a labor force skilled in the use of computers, electronic technology, and information dissemination.
- Zoning, physical infrastructure, and other economic development strategies will have little effect in attracting service industries unless accompanied by enhancement of technical skills, job training programs, and social support system for the local labor force.
- The current pattern of urban and suburban development has created a development pattern which forces low-skill, low-wage workers to commute long distances to work in communities which have attracted service industries but have not produced housing commensurate with the incomes of the labor force.

## **■ POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Approval of future development predicated on ability to maintain level of service standards.*
- *A holding capacity or other limit which would address projected housing and employment growth in the East County.*
- *An adequate supply of housing, especially low and moderate income housing, in the East County to decrease the need for commuting into Tri-Valley employment areas especially along the I-580 corridor (from Tracy and Manteca) and the I-680 corridor (from Pittsburg, Antioch, and Brentwood).*
- *Increased coordination and cooperation with San Joaquin County.*
- *A revenue supply adequate to fund projected demand for public facilities, infrastructure, and services.*

- *Economic development programs which attempt to capture the projected growth in service businesses in all parts of Alameda County.*
- *Economic development programs which promote investment in telecommunications and other technical infrastructure which will be required to attract service businesses to Alameda County.*
- *Job training programs to produce a labor force skilled in the use of computers, electronic technology, and information dissemination.*
- *Social programs (such as child care and job placement) to provide the social support system needed by the local labor force.*
- *Provision of housing for low-skill, low-wage workers in, or adjacent to, communities which provide service industry employment.*
- *Provision of back office space to accommodate service industry employment opportunities for low-skill, low-wage workers both in the East County and other locations in Alameda County.*



**Sources:**

US Census of Population and Housing, Summary Tape File 1, 1992

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## Jobs and Housing

### ■ INTRODUCTION

A balanced relationship between jobs and housing has become a critical ingredient in the attainment of efficient and desirable communities. The California Department of Housing and Community Development, in its draft report entitled *101 Steps to Better Housing*, defines jobs/housing balance as follows:

A jobs/housing balance occurs if people live in housing that is affordable at the wages they earn, and travel minimum distances to their jobs and the services they use.

The jobs-housing concept is used to examine whether an area has a balance between its housing supply and its employment base. The primary functions of a jobs-housing analysis are to: 1) provide a generalized measure of housing demand in a given area; 2) determine whether housing is available and affordable to meet housing demand; and 3) evaluate the potential severity of a jobs-housing imbalance on traffic congestion and fiscal imbalances.

An area that has too many jobs relative to its housing supply is likely to experience rapid escalations in housing prices (with a concurrent decline in affordability for the lower-income segments of the community), and intensified pressure for additional residential development. Conversely, if an area has relatively few jobs in comparison to employed residents, many of the workers are required to commute to jobs located elsewhere. The resulting traffic patterns can lead to road congestion and reductions in both local and regional air quality. Even if communities have a statistical balance between jobs and housing, they are still very likely to experience sizable levels of in-commuting and out-commuting, given the dispersed nature of employment and residential opportunities elsewhere in the region and the mobility offered by the automobile. Jobs-housing indices are more useful for examining the potential for "self-containment" at the regional or subregional level than in determining whether this self-sufficiency actually exists in a given community.

The following discussion examines the jobs/housing relationship in the East County and the Tri-Valley subregion. (For the purposes of this background report, "existing conditions" represent the year 1990, the most recent year for which there is reliable and extensive data.)

### ■ EXISTING CONDITIONS

The balance between population and employment is typically measured in two ways. The simplest measure is a ratio of jobs to employed residents, with 1.0 indicating a perfect balance between the two variables. However, this simple measure ignores housing affordability. A community can have a theoretical balance between jobs and housing, yet also have none of its housing stock affordable to its locally-employed work force.



## Jobs/Housing Ratio

As noted, the degree of numerical balance between jobs and housing can be measured by a ratio which quantifies the relationship between the number of housing units required as a result of local jobs and the number of housing units available in that locality. Jobs per employed resident is the accepted measure of the jobs/housing balance ratio. This is calculated as:

$$\frac{\text{\# of jobs}}{\text{employed residents}} \\ (\text{\# of households} \times \text{\# of workers per household})$$

A value of 1.0 indicates a situation in which there is housing available for each member of the workforce within a given area. A value greater than 1.0 indicates an in-commute situation in which there is a deficit of housing units, whereas a value smaller than 1.0 indicates an out-commute situation in which there is surplus of housing. For example, ABAG projects that there will be 1.58 workers per household in the Tri-Valley in the year 2010. Using this ratio, the Tri-Valley could support 1.58 times as many jobs as households or, conversely, the area would require .63 (the inverse of 1.58) household for each job. For every 100 jobs projected, 63 households (or 66 housing units assuming a 5 percent vacancy rate) would be needed to attain a jobs/housing ratio of 1.0. This equation does not take into account housing affordability but simply measures a numerical relationship between supply and demand for housing. Table B-7 shows the jobs/housing data for the Tri-Valley.

In the Bay Area, the jobs/housing ratio is 0.98 indicating that the region has, at least numerically, a sufficient amount of housing needed by the workforce. Despite this situation, workers are currently forced to commute into the Bay Area from outside the region, mostly from San Joaquin, Santa Cruz, and San Benito Counties where more affordable housing is available. In the Tri-Valley subregion, the existing jobs/housing ratio is 0.91, which is better, from a housing standpoint, than the region as whole. In the East County, however, the jobs/housing ratio is 1.02, slightly worse than the San Francisco Bay region, while the Contra Costa portion of the Tri-Valley subregion is 0.74, indicating a significant numerical surplus of housing.

## Housing Affordability

The Tri-Valley is seen by people who work in other parts of the Bay Area as one of the few remaining areas of affordable housing since prices are generally less than they are elsewhere in the Bay Area. As a result, many buy homes in the Tri-Valley and commute, generally by car, to employment centers to the west. In 1990, of the estimated 62,200 daily home-based work trips out of the East County, 21 percent were to the Hayward area, 20 percent were to the Oakland area, 19 percent were to Santa Clara County, 18 percent were to Contra Costa County, 7 percent were to San Francisco, and 4 percent were to San Mateo County. These commuters contribute to the increasing demand for housing in the East County which, in turn, increases the cost of housing.

TABLE B-7						
Jobs/Housing Ratios for the Tri-Valley Subregion - 1990 and 2010						
Area	EPS - 1990			EPS Projections - 2010		
	Households/ Employed Residents	Jobs (#)	J/H Ratio	Households/ Employed Residents	Jobs (#)	J/H Ratio
East County Portion of Tri-Valley	47,696/ 74,406	76,231	1.02	92,068/ 145,467	147,962	1.02
Contra Costa County Portion of Tri-Valley	30,857/ 48,137	35,418	0.74	47,584/ 75,183	54,924	0.73
Total Tri-Valley	78,553/ 122,543	111,649	0.91	139,652/ 220,650	202,886	0.92
<b>Note:</b> Assumes 1.56 employed residents per household for 1990; assumes 1.58 employed residents per household for 2010.						
<b>Source:</b> Alameda County Planning Department (household and job data derived from EPS, CCTA Projections based on ABAG <u>Revised Projections 90</u> (June 5, 1992).						

Existing housing data for the East County is shown in Table B-8. The distribution of housing units between owners and renters and between detached and attached units is relatively uniform among the three cities. Rental units and attached units each represent an average of 32 percent of the housing units in the East County. While this distribution of rental and attached units is lower than in larger cities such as San Francisco and Oakland, it is higher than in many suburban areas. In the East County, the median value of ownership housing is \$252,950 and the median contract rent averages \$732 per month. Although home values and rents are lower than in some locations closer to the employment centers of San Francisco and Oakland, East County prices have escalated recently to the point of being above the average for the nine county Bay region. Therefore, existing homeownership and rental costs in the East County are beyond the means of many workers. This "affordability gap" is resulting in substantial numbers of workers commuting in from less expensive areas.

TABLE B-8

## Existing Housing Price Conditions for East County Cities

Area	Median Housing Unit Value	Median Contract Rent	Housing Units	Households	Percent Renter Occupied	Percent Attached Units
Dublin	\$240,900	\$811	6,992	6,802	35%	29%
Livermore	\$217,300	\$680	21,489	20,643	33%	30%
Pleasanton	\$297,200	\$760	19,356	18,484	30%	35%
Remainder East Co.	n/a	n/a	1,913	1,836	n/a	n/a
Total East County	\$252,950	\$732	49,750	47,765	32%	32%
<b>Note:</b> Data derived from the US Census, ABAG, and EPS differ slightly due to varying collection techniques.						
<b>Sources:</b> US Census of Population and Housing, <u>Summary Tape File 1</u> , 1992; ABAG, <u>Projections 92</u> , July, 1992.						

## Forecast Methodology

(Refer to the "Forecast Methodology" section in the *Population and Employment Growth* background report for additional information. Refer also to Appendix 4 for supplemental tables and further discussion on methodology).

In 1990, the Tri-Valley Wastewater Authority (TWA) conducted a study of the cumulative effects of jobs and housing growth in the Tri-Valley area. That report, prepared by Economic and Planning Systems (EPS), contains land use capacity forecasts (estimated capacities at buildout) for an "Existing General Plan" scenario based on the general plan policies of each city and for a "Prospective General Plan" scenario, which takes into account the cities' existing General Plans plus a number of major General Plan Amendments that are in various stages of the planning process (i.e., Eastern Dublin, Western Dublin, North Livermore, South Livermore, Pleasanton Ridge, and Dougherty and Tassajara Valleys). The data consist of a tabulation of existing development, planned projects and the holding capacity of vacant land designated for urban development in the general plans of the cities, including some unincorporated areas that the cities plan to annex in the future. The report estimated that buildout would occur under the



existing General Plans in 20 to 30 years and under the prospective General Plans in 40 to 60 years, assuming an annual average population growth rate between 1.5 and 2.5 percent. Both Livermore and Pleasanton have growth management programs that limit the number of housing units that can be allocated for each year.

Alameda County retained Economic and Planning Systems (EPS) to update growth projections in the TWA study and further analyze the relationship between jobs and housing units in the Tri-Valley and East County areas. EPS examined the jobs/housing situation from three interrelated perspectives: numerical balance, housing affordability, and commuting constraints. These analyses are discussed below.

Numerical Balance. This analysis compares potential housing supply with potential housing need as generated by the existing and prospective General Plan policies, zoning, and land use programs (see Table B-9 below and Table G-3 in Appendix 4.) Both the Alameda and Contra Costa County areas of the Tri-Valley are evaluated. Since these two areas together represent a distinct economic subregion within the Bay Area, they should be in balance in terms of jobs and housing.

Affordability Constraints. In order for the housing stock to support job growth, housing prices need to be in line with the income distribution of the employment base. EPS developed a model to forecast occupational and household income distributions based on the projected sectoral distribution of employment in the Tri-Valley and then estimated the future price distribution of housing supply, based on density/product type/price relationships in each of the Tri-Valley communities. A comparison of these distributions gives an indication of which price ranges of housing will be under-supplied and the number of additional units needed in each price category. (See Table G-4 in Appendix 4.)

Commuting Constraints. In a metropolitan region there will inevitably be cross-commuting among communities, as workers select employment and residential locations for different reasons. Thus, not all Tri-Valley housing units will be available to Tri-Valley workers. Similarly, it may be expected that workers will be "imported" from outside the area to some degree. The demand for workers from particular locations, and therefore the commute demand on particular roadway segments, will be influenced by income distributions of the employment base and the relative affordability of housing in particular locations. EPS estimated the number of workers that will need to be "imported" into the Tri-Valley, given likely future commute patterns, and evaluated the degree to which transportation capacity might constrain labor force commutation. (See Tables G-7 and G-8 of Appendix 4.)

Results of these analyses are discussed below under "Trends" and "Planning Issues".

[*Note: Excerpts from the EPS studies have been used in this report.*]

## ■ TRENDS

### Buildout of Existing and Prospective Plans Would Create a Housing Deficit in the Tri-Valley

Table B-9 compares potential housing need to potential housing supply under full buildout conditions of the existing and prospective General Plans. (Table G-3 in Appendix 4 shows this data by subarea.) Under the prospective General Plans, the East County would have a housing deficit of approximately 37,600 units (i.e., the housing need of workers employed in the area exceeds local housing supply by 37,600 occupied units) and the Contra Costa County portion of Tri-Valley would have a housing surplus of 16,250 units, producing an overall housing deficit of approximately 21,300 units in the Tri-Valley as a whole. (Under buildout of existing General Plans, the housing deficit would be about 49,000 houses.)

TABLE B-9

#### Job/Housing Ratios for Tri-Valley Subregion: Buildout of Existing and Prospective General Plans

Area	Existing General Plans			
	Housing Capacity	Housing Need*	Housing Surplus/(Deficit)	J/H Ratio
East County Portion	61,048	113,247	(52,199)	1.86
Contra Costa County Portion	37,877	34,616	3,261	0.91
Total Tri-Valley	98,925	147,863	(48,938)	1.49

AREA	Prospective General Plans			
	Housing Capacity	Housing Need*	Housing Surplus/(Deficit)	J/H Ratio
East County Portion	103,436	141,015	(37,579)	1.36
Contra Costa County Portion	51,822	35,571	16,251	0.69
Total Tri-Valley	155,258	176,586	(21,328)	1.13

\* Housing need is based on employment potential generated by land use policies.

Source: Alameda County Planning Department; derived from Economic Planning Systems, Table G-3 in Appendix 4.



According to ABAG's twenty-year housing demand projection, there would be a housing deficit under existing general plans and a housing surplus under prospective general plans by the year 2010 (compare Table B-7 with Table B-9). At projected employment growth rates, there will be nearly 18,000 fewer jobs than employed residents in the Tri-Valley (see Table B-7) resulting in a slight loss in the current "housing cushion" (the J/H balance would rise from .91 to .92). The outpacing of employment growth by population growth in the Tri-Valley indicates that there is a surplus of commercial and industrial land under current and prospective plans.

### **Housing Costs Will Continue to Increase**

Housing prices have increased much faster than household income in the East County area in the past few years, as they have throughout the Bay Area. Figures from the Southern Alameda County Board of Realtors (SACBOR) show that between 1985 and 1989, the average sale price increased 69 percent in Dublin from \$134,657 to \$227,244, 60 percent in Livermore from \$125,235 to \$200,167, and 56 percent in Pleasanton from \$168,490 to \$262,389; compared to a 65 percent increase countywide. Although the average sales price continues to rise, it appears that the rate of increase has slowed in recent years. By 1991, SACAR reported average sales prices of about \$226,000 in Dublin, \$207,000 in Livermore, and \$275,000 in Pleasanton.

The "affordability gap" between income and the price of housing is keeping many households out of the housing market. A household earning \$46,800 per year (the median income for a family of four in Alameda and Contra Costa Counties in 1992 according to H.U.D.) could afford a maximum purchase price of just over \$175,000, clearly below the cost of most houses on the market. A comparison of household incomes and affordable housing costs for renters and owners is contained in Table G-5 of Appendix 4, and household income category by income for the East County is shown in Table G-6 of Appendix 4.

Housing costs increased at a much faster rate than personal income due in part to an increase in the number of two-income households. However, as labor force growth tapers off, household income will not continue to grow at a healthy rate unless real wages increase at a faster pace. As household income levels off, so will the amount a household can pay for housing.

A survey conducted by the Bay Area Council based on a sample of rents advertised in local newspapers showed a 4.8 percent increase (from \$625 to \$655) in the median rent for a two-bedroom unfurnished apartment in Southern Alameda County (which includes the East County) between July 1989 and July 1990. The same survey showed the median rent for the entire Bay Area as unchanged at \$750 per month for the same period.

According to an October 1989 ABAG report titled "San Francisco Bay Area Rental Housing Market: Near Term Forecasts of Rents, Availability, and Affordability," the average rent in the City of Livermore increased 4 percent, from \$630 to \$655 between 1988 and 1989, and was projected to increase an additional 6 percent, to \$695 in 1990. The report indicates no increase in the average rent (\$647) in the City of Pleasanton between 1988 and 1989. A one percent increase, to \$655, was projected in 1990. In general, the incomes of renters tend to be lower than those of homeowners. Although specific information is not available for the East County,



countywide data indicate that rents are increasing more rapidly than the incomes of renters, forcing renters to pay a greater percentage of their incomes for rent.

### **Planned Growth in the Tri-Valley Subregion Will Result in Housing Deficits for Lower Income Workers**

Under buildout of the prospective General Plans for the Tri-Valley subregion, housing affordable to households earning less than \$28,400 annually have a severe projected deficit of about 32,000 units in the Alameda County portion of the Tri-Valley. This income range translates into a maximum affordable unit purchase price of approximately \$107,000, or units renting for about \$700 per month. Considering only households in the upper end of the range, those earning from \$15,000 to \$28,400 annually, average affordable unit prices are estimated at about \$82,000. It is unlikely that for-sale housing could be provided at this price without subsidies. Even in the more affordable communities of the Central Valley, housing sales prices exceed \$85,000. In all likelihood, many of these potential households will be renters, will combine to share housing, will live with parents, or will need subsidies of some kind.

The Contra Costa portion of the Tri-Valley is also under-supplied in the under \$28,400 income range, with a deficit of almost 10,000 units. An additional deficit of approximately 4,000 units is projected to occur in the income categories between \$28,400 and \$66,200.

Housing affordable to households in the over \$94,000 income range is likely to be oversupplied throughout the Tri-Valley, relative to the region's employment base income distribution. Surplus housing potentially affordable to households in the two highest income categories, including those earning \$66,200 or more, is projected to be approximately 42,500 units. The skew towards the higher income brackets in the Tri-Valley is much more pronounced in the Contra Costa County portion of the Tri-Valley than in the Alameda County portion. Many of these expensive homes probably will be occupied by workers commuting to jobs outside the Tri-Valley.

Conversely, there is an estimated deficit of approximately 42,000 units affordable to households earning under \$28,400, and a deficit of almost 22,000 units affordable to households earning from \$28,400 to \$66,200 throughout the Tri-Valley region. It is likely that the severe deficits expected in Alameda County will compound the lower-income housing deficits projected for Contra Costa County. This would work to significantly offset any jobs/housing relief from the nominal surplus projected for the Contra Costa County portion of the Tri-Valley. The above data is presented in Table G-4 in Appendix 4.

### **Highway Capacities Will Constrain Employment Potential as Planned and Proposed in the Tri-Valley Subregion**

The freeways running through the Tri-Valley (I-680 running north-south, and I-580 running east-west) form four principal "gateways" into the Tri-Valley. These major routes are supplemented by smaller routes such as Vasco Road, Crow Canyon Road and Niles Canyon Road/Highway 84, which provide additional capacity to the gateways.

As determined by EPS, in-commute capacity on these gateways presents a major constraint to the realization of employment potentials under the prospective General Plans for the Tri-Valley subregion. EPS projected that nearly 40,000 of the approximately 123,000 jobs, potentially created under current and proposed land use policies, would be unrealized as a result of the inability of the highway system serving the Tri-Valley subregion to accommodate incommuting workers. (See Table G-9 in Appendix 4.) This is equivalent to a resident workforce of approximately 26,500 households.

Tables supporting this data and a discussion of the commute constraint analysis can be found in Appendix 4.

### ■ PLANNING ISSUES

The following is a summary of conclusions derived from the EPS analyses:

- Existing General Plans in the East County do not provide sufficient housing to meet ABAG's projections of demand, but call for more employment than can be realistically absorbed by the year 2010.
- Development of prospective General Plans (existing General Plans and proposed amendments) in the East County, while improving the jobs/housing ratio over existing General Plans, would still result in employment exceeding local housing supply by significant amounts.
- Development of prospective General Plans in the East County would result in an oversupply of housing affordable to households earning over \$94,000 and undersupply of housing affordable to households earning less than \$28,400 (representing a deficit of 32,000 units) and to households earning between \$28,400 and \$66,200 (representing a deficit of 18,000 units).
- If a deficit of housing occurs, it will result in long commutes that will greatly increase traffic congestion and air pollution and will continue to drive up home prices by widening the gap between supply and demand. The high cost of housing in the East County may force some people who work at low paying jobs in the Tri-Valley to seek housing in the low income areas of Oakland or in the Central Valley. Low income workers may tend to place a higher value on working close to home since their commuting costs are a higher percentage of their incomes.
- Continued economic development requires an adequate supply of housing for the workers filling newly-created jobs. (Employment growth of approximately an additional 71,000 jobs in the East County is projected by 2010.) The failure of employment development to take place would prohibit cities from realizing projected tax revenues and carrying out planned infrastructure and public facility projects.



- Economic and population growth in the East County has already begun to increase development pressure in the Central Valley, resulting in a loss of productive agricultural land, a loss of Alameda County jobs to San Joaquin County, and the attendant environmental effects of long commute distances for the East County workers who are forced to seek affordable housing east of the Altamont Pass.

While the three perspectives on jobs/housing relationships undertaken by EPS (numerical balance, housing affordability, and commute constraints) do not necessarily yield a specific "prescription" in terms of the number of housing units that must be provided in particular density/price ranges, together they describe the shape and size of the need and provide a benchmark to gauge policy implications.

The goals of accommodating projected economic growth and attaining a jobs/housing balance can best be achieved by changing existing and proposed land use policies, most specifically by cutting down on potential employment to the point where highway capacity is not exceeded and by providing sufficient affordable housing at all income levels for the future workforce.

## ■ POLICY IMPLICATIONS

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Revision of existing General Plans and proposed General Plan Amendments to provide sufficient housing to meet ABAG's projections of demand, and to limit employment generating land uses to a level that can be realistically absorbed*
- *Provision of housing units at a quantity and price which approximates the number and income level of local jobs within the East County, in order to reduce commutes, traffic congestion, air pollution, and housing prices*
- *Provision of a revenue supply adequate to fund projected demand for public facilities, infrastructure, and services*
- *Creation of economic development programs to improve the vitality of the East County*
- *Development of housing units affordable to households earning less than \$28,400 and to households earning between \$28,400 and \$66,200*
- *Revision of existing City General Plans and proposed amendments in the East County to reduce the projected oversupply of housing affordable to households earning over \$94,000*



**SOURCES:**

Alameda County Planning Department, Alameda County General Plan, Land Use, and Jobs/Housing Analysis, prepared by Economic and Planning Systems, July 1992.

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## **Fiscal Considerations**

### **■ INTRODUCTION**

In recent years, it has become increasingly difficult for counties and cities to collect an adequate amount of revenue to cover the costs of providing services to their residents. Local governments rely on revenue from a variety of sources. However, since the passage of Proposition 13 in 1978, the amount of revenue available from some of these sources, especially property taxes, has been drastically reduced, while the cost of providing services has continued to increase. This loss of tax revenue has caused local governments to rely more heavily on other sources of revenue, altering their approach to land use planning and development.

### **■ EXISTING CONDITIONS**

#### **Revenue Sources - General**

The most important sources of tax revenue for local governments are property taxes and sales taxes, since each of these make up a substantial portion of the revenue collected by local jurisdictions. Other revenue sources include developer fees, special assessment districts, bonds, and a variety of other taxes and fees.

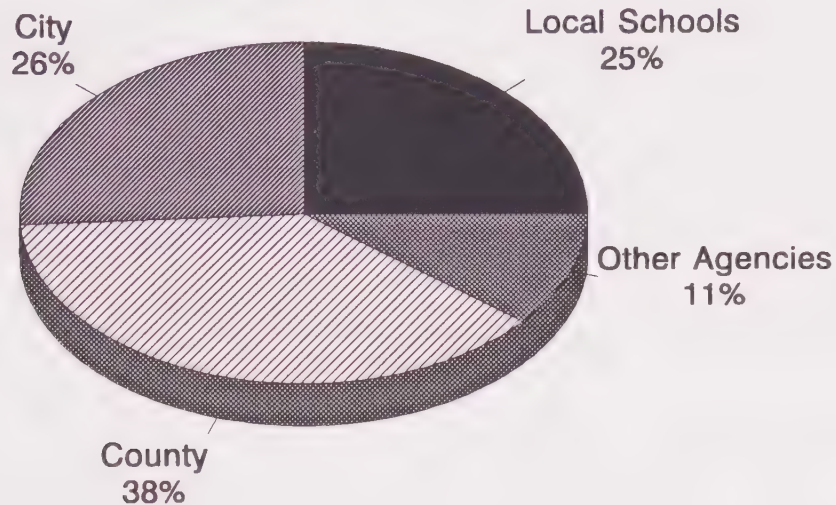
Property Tax. Although the county is responsible for collecting property taxes, the revenue is divided among the county, the special districts that serve the area in which a property is located and, if a property is located within a city, the city in which it is located. How the revenue is divided varies from county to county and is determined by a tax exchange agreement between each county and the cities and special districts within it. Section 99 of the State Revenue and Taxation Code outlines the process through which a tax exchange agreement is negotiated.

In Alameda County, property tax revenue is normally divided according to what is known as the "Mayors' Formula," which was developed in 1980 by the Alameda County Administrator and Alameda County Mayors' Conference. According to the Mayors' Formula, except where a substantial portion of the area to be annexed includes a developed commercial area, allocation of the property tax revenue from the area is based on the city and County's existing tax allocation ratio within its corporate limits. A typical distribution in the East County is 38 percent to the County, 26 percent to the city, 25 percent to local schools, and 11 percent to other agencies. The graph titled "Typical Property Tax Distribution" illustrates this distribution. For areas where a substantial portion of the area to be annexed includes a developed commercial area, the County conducts an analysis of non-property tax revenues versus County service costs to determine what portion, if any, of the County allocation is redistributed.



## TYPICAL PROPERTY TAX DISTRIBUTION in East County, by Percentage

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Proposition 13, a statewide measure adopted by voters in 1978, rolled property taxes back to one percent of the 1975 appraised property value and placed a 2 percent limit on annual increases. A two-thirds vote of the local residents is required to increase the tax rate. Proposition 13 significantly altered the power of local government to collect and spend public revenue, but did not substantially modify its responsibilities to provide services to its residents. For the 1978-79 fiscal year, current property taxes constituted 40.3 percent of Alameda County's general fund. However, current property taxes make up only 22.9 percent of the County's general fund for the 1992-93 fiscal year. At the same time, federal and state funding was drastically cut for many programs, leaving cities and counties without adequate revenue to provide essential services.

Redevelopment is intended as a tool to be used by cities and counties to revive blighted areas. State law permits local governments to use their powers of eminent domain to acquire property and to use tax-increment financing to subsidize projects within designated redevelopment areas. Tax-increment financing allows future increases in property tax revenue generated by improvements within redevelopment areas to be returned to the redevelopment agency to finance future improvements. As a result, counties can lose a substantial amount of tax revenue when redevelopment projects are created in cities. In 1992, Livermore is the only city in the East County with an active redevelopment project and is currently attempting to increase the revenue cap in the district from \$12.5 million to \$500 million. The revenue cap is the maximum amount of revenue a redevelopment agency can collect through tax increment financing. Any tax increment collected that is above the amount of the cap is divided among jurisdictions in the same manner as the base property tax.

**Sales Tax.** As a result of the loss of property tax revenue, local governments now place greater emphasis on sales tax as a major revenue source. The state government collects sales tax revenue and returns one percent of each dollar in sales to the local jurisdiction in which the sale occurred. Cities receive sales tax revenue for sales that occur within their boundaries and the county receives sales tax revenue for sales that occur within the unincorporated area of the county. The higher the dollar value of the sales that occur within a jurisdiction, the more sales tax revenue that local government will receive.

Unlike property tax, sales tax generally keeps pace with inflation; although during slow economic times sales tax revenue tends to level off or fall as local residents adopt more conservative spending habits. Counties may adopt, with voter approval, up to one percent in additional sales tax if it is dedicated for a specific purpose. For example, Alameda County's Measure B added one-half percent for transportation improvements.

Generally, when an unincorporated area is annexed to a city, all of the sales tax generated within that area and a portion of the property tax revenue, in accord with the tax exchange agreement negotiated by the city and county, shifts to the city to which the property is annexed. The city then becomes responsible for providing those services it provides to the rest of the incorporated area. The county remains responsible for providing those services it provides countywide. Some counties in the state have tax exchange agreements with the cities within their boundaries in which a portion of the sales tax revenue that the cities receive is transferred to the county. Most of these agreements involve only a small portion of the sales tax revenue.

### **Revenue Sources - New Development**

**Developer Fees.** Since the passage of Proposition 13, developer fees have become a very common method of financing public facilities and services for new development. These fees can be used to finance infrastructure to serve new development (such as schools, parks, and roads), or in lieu of monetary fees, developers may dedicate land within the new development for certain public facilities. In a healthy real estate market, developers pay the fees directly and then add them to the price of the developed residential property. As the real estate market slowed, developers began to pay for some of the fees out of their profits in order to lower the price of their houses. The advantage of developer fees is that the new infrastructure is paid for by those who will benefit from it, rather than by existing residents. However, the fees can add many thousands of dollars to the cost of a home, an important concern in an area where affordable housing is scarce.

**Special Assessment Districts.** Special assessment districts are another way in which the cost of public improvements can be shifted to those who benefit directly from them. Many different types of special assessment districts are permitted under state law. Some may be used to fund only the capital cost of construction of public facilities, while others may be used for the operation and maintenance of these facilities. Assessment districts may be used to fund a variety of public facilities and services, including street paving and maintenance, parks and recreation facilities, landscaping, street lighting, sewers, geologic hazard abatement, fire protection systems, tree planting and maintenance, parking facilities, libraries, and open space maintenance.



*Mello-Roos Community Facilities Districts.* One of the most common forms of assessment district in recent years is the Mello-Roos Community Facilities District. Mello-Roos Districts, named for the authors of the state legislation that created them, issue bonds to fund specified public facilities and infrastructure for a particular area. The bonds are repaid using taxes collected from the property owners in that area. A district is created by a two-thirds vote of the property owners in the designated area. The area can be developed or undeveloped. As the sole property owner of a large undeveloped area, a developer can create a district to finance infrastructure for future development with a single vote. After the property is developed the new residents would be responsible for paying the additional tax. Unlike traditional assessment districts, Mello-Roos districts can be used to fund the operation and maintenance of facilities, as well as the capital costs of construction.

At first glance, a home within a development financed through a Mello-Roos District is "cheaper" than a comparable home for which the development costs are all reflected in the purchase price. However, the purchaser of the "cheaper" home pays for the development costs throughout the life of the bonds. For this reason, developers are (or should be) cautious that the Mello-Roos debt load does not exceed an accepted percentage of a homeowner's total housing cost. (As the use of Mello-Roos financing becomes more widespread, public awareness of the implications of this tool is also increasing: the slogan "No Mello-Roos" is becoming a common sales pitch in the advertising of new subdivisions.)

*County Service Areas.* County Service Areas (CSAs) are a type of special assessment district that can be used to provide a higher level of specific services to a designated unincorporated area than those generally provided within the entire county. The taxpayers within the CSA finance the additional cost of these services. A CSA may include all of the county's incorporated or unincorporated area or only a portion of it. CSAs may be used to provide a wide range of municipal services. However, the county must demonstrate that the proposed level of extended service is not otherwise provided countywide. The use of CSAs has increased significantly since the passage of Proposition 13.

CSAs, governed by the County Board of Supervisors, can serve as the entity responsible for owning and operating special facilities (such as discrete wastewater treatment plants which operate independently of existing municipal sewer systems) or special services (such as augmented police or fire protection services) to serve a particular development. Only residents of the delineated service area would pay for and receive the special services.

Bond Financing. Bonds allow local jurisdictions to borrow money to finance public facilities and infrastructure. An obstacle to the use of bond financing is that approval by a majority of the voters in the jurisdiction that will issue the bonds is required. These voters are current residents and are not likely to approve a bond measure that will benefit future residents and not themselves. Therefore, bonds tend to be used to finance facilities or improvements that will benefit existing residents or for economic development projects that will bring jobs and additional tax revenue to the community. Bond financing is an expensive option since bonds must eventually be paid back with interest.



In the past, two types of bonds were commonly used by local governments: general obligation bonds, which must be repaid out of the local jurisdiction's general fund, and revenue bonds, which are repaid using revenue generated by the project for which the bond funds were used. Proposition 13's restrictions on local government's ability to raise taxes has diminished the ability of cities and counties to issue general obligation bonds since it is now very difficult to raise taxes to repay the bonds. The Federal Tax Reform Act of 1986 severely restricted the use of these bonds by limiting the dollar amount of tax-exempt revenue bonds that can be issued in California each year.

## ■ TRENDS

### **Increased Financial Difficulties for County Government**

The 1991-92 Governor's Budget states: "Counties have been forced to dedicate increasing portions of their general purpose revenues to support state programs, without having the flexibility to reduce service levels or manage programs more efficiently." State underfunding and cost shifts, together with a flattening of general purpose revenue growth due to the recession, has triggered the County's current budget crisis.

Like cities, counties provide a wide range of services, such as police and fire protection, street maintenance, flood control and land use planning to the areas within their boundaries. However, unlike cities, counties are mandated by state and federal law to provide certain services such as health care, social services, welfare, judicial programs, and public protection to residents of both the incorporated and unincorporated areas. In order to provide these services, the county must construct facilities such as hospitals, courts, and jails. Counties must provide these additional services and facilities without receiving adequate state and federal funding to cover the cost of these programs. As the populations of the cities increase, the demand for mandated county services and facilities also increases, without benefit to the county.

Counties were, in general, hit harder than cities by the revenue loss resulting from Proposition 13. Because most of the sales tax generating businesses are located within cities, counties are more dependent on property tax revenue and federal and state funds, all of which have been drastically reduced in recent years. In 1980, taxable transactions in unincorporated Alameda County totaled \$502 million, nearly 8 percent of the \$6.5 billion total taxable transactions in the County. In 1990, taxable transactions in the unincorporated County totaled \$475 million, only 3 percent of the \$13 billion total taxable transactions in the County. The sales in the unincorporated portion of the East County accounted for just less than 22 percent of the \$475 million unincorporated total. While 10 percent of the total population of the East County lives in the unincorporated portion of the planning area, total taxable transactions in the unincorporated area represent roughly 6 percent of the total taxable transactions in the East County. As areas are annexed to cities, the County loses the potential for adding to its sales tax base by developing sales tax-generating uses in these areas.

## **Loss of County Revenues to City Redevelopment Areas**

Redevelopment has become a common method of encouraging revenue-generating development within a local jurisdiction. However, redevelopment within cities has a negative effect on the amount of tax revenue the county receives. Since redevelopment agencies are funded using tax increment financing, future increases in property tax revenue generated by improvements to property within a redevelopment area go to the redevelopment agency instead of being divided among jurisdictions according to the tax exchange agreement. Alameda County has negotiated "pass-through agreements" with a few of the cities in the County, in which the cities have agreed to "pass through" to the County all or a portion of the property tax increment generated within the cities' redevelopment areas. The County does not have a pass-through agreement with the City of Livermore.

## **Reduced Ability to Raise Revenues**

The County's budget problems have been exacerbated by the fact that, unlike cities, counties have very few ways to increase revenues. Before Proposition 13, counties controlled property tax rates and assessed values within their jurisdictions. Proposition 13 placed the tax formula in the State Constitution. As a result, the County's ability to raise funds to maintain programs has been severely limited.

## **Increasing Fiscalization of Land Use**

As a result of the loss of property tax revenue in the wake of Proposition 13, local governments began to place greater emphasis on the fiscal impacts of their land use decisions and less emphasis on creating balanced communities. This trend has become known as the *fiscalization of land use*. Many local governments have turned to sales tax as a major revenue source by encouraging commercial development, or have sought industrial or high-end residential development which tends to bring in more property tax revenue than the cost of services required. The push for revenue-generating development has encouraged rapid urban expansion, and has created competition between cities and between cities and counties for revenue-generating projects. This interjurisdictional competition exacerbates growing regional problems such as the widening jobs/housing imbalance, a lack of affordable housing and traffic congestion, resulting from the long commutes between housing and jobs.

## **■ PLANNING ISSUES**

### **Interjurisdictional Competition and Fiscalization of Land Use**

Land use and population projections based on proposals currently being considered by the cities in the East County predict a significant imbalance between jobs and housing in the region, as the cities encourage job-generating commercial and industrial development over affordable housing needs. A new method of dividing local tax revenue could reduce the fiscal benefit of pursuing revenue-generating development and reward jurisdictions that provide for land uses that fulfill a regional need.



One way in which this redistribution of revenue could be accomplished is through the renegotiation of the tax sharing formula between the cities and the County. The new formula could address the division of property tax, sales tax and developer fees to provide incentives and remedies to local jurisdictions to encourage development that is beneficial to the region and, also, ensure that all jurisdictions affected by new development receive a portion of the revenue from the new development commensurate with their costs of providing services. The recent agreement between Alameda County and the City of Dublin for property in East Dublin demonstrates how this approach to tax sharing negotiations could be combined with land use negotiations.

Many counties in the state have sales tax sharing agreements with their cities, most of which involve only a small portion of the sales tax. However, the cities in Napa County share fourteen and a half percent of their sales tax revenue with the county in exchange for a countywide agreement to prevent urbanization outside of the City of Napa to protect the County's agricultural land. In 1987, Fresno County took action to terminate its master property tax agreement with the City of Fresno. In 1991, the city and county entered into a new master property tax agreement which goes well beyond the scope of the earlier document. In addition to the division of property tax revenue, the new agreement addresses the fiscal impact of redevelopment, sales tax sharing, annexation, and land use.

If the local jurisdictions in the East County are to avoid the considerable jobs/housing imbalance that is projected for the future and provide adequate public services and facilities to their growing populations, they will need to recognize inequities and regional responsibilities.

### **Developer Fees for Infrastructure**

Providing adequate infrastructure for new development without burdening existing residents is a primary concern for jurisdictions. jurisdictions can no longer afford to provide infrastructure for new development out of general fund and must rely more heavily on developer fees to cover infrastructure costs.

Infill development is generally considered to be desirable since it uses land within existing urban areas more efficiently and prevents the urbanization of open space outside the existing urban area. However, the age and limited capacity of the infrastructure within existing urban areas is often an obstacle to infill development. Since infill projects are typically small-scale, they cannot cover the costs of infrastructure replacement on their own and existing residents are often unwilling to pay for infrastructure improvements they perceive as beneficial to new development.

### **Funding County Facilities**

Funding for County facilities, such as hospitals, jails and government offices, used by residents of both incorporated and unincorporated areas, is another important issue to be addressed. State law mandates that the County provide these facilities to serve all county residents, but does not provide adequate funding to cover their costs. A mechanism, such as a countywide capital facilities fee, should be developed in cooperation with cities to fund these facilities.



## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Equalization of the fiscal costs and benefits of development to encourage development that is beneficial to the region and eliminate interjurisdictional competition*
- *Equitable distribution of property/sales tax revenue and developer fees based on the cost of services provided*
- *Assurance that the costs of infrastructure to serve new development are covered by new development*
- *Calculation of infrastructure costs to include the replacement cost of the infrastructure at the end of its useful life*
- *Provision of adequate funding for County facilities that serve East County residents*

## SOURCES

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# Demographic & Traffic Data Study Zones

## LEGEND

- 6. Dublin
- 7. West Dublin
- 8. East Dublin
- 9. Pleasanton
- 10. Pleasanton Ridge
- 11. Livermore
- 12. North Livermore
- 13. South Livermore

**NOTE:** Zones were developed by TJKM Transportation Consultants for the Tri-Valley Transportation Model and have been used by Economic and Planning Systems, Inc. and Alameda County for East County demographic projections. Zones may differ from city general plan and general plan amendment boundaries.



SOURCE: Alameda County Planning Department

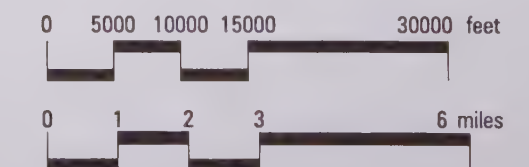


FIG. 10











## Transportation

### ■ INTRODUCTION

The information provided in this report will identify the existing settings and conditions affecting the transportation and circulation systems, describe influencing trends both locally and regionally, and discuss planning issues and policy implications.

### ■ EXISTING CONDITIONS

#### Existing Transportation System

The East County's transportation system is comprised of an interconnected network of federal, state, city and county roads, local and regional transit systems, local bikeways, and rail right-of-ways (see Figures 1, 11, 13 and 14). Several of the major roadways serve to connect the Central Valley and the Bay Area.

#### Highway and Road Network

Roadway access into and out of the East County is primarily by four major access points: Altamont Pass (in the east), Dublin Canyon (in the west), San Ramon Valley (in the north), and Mission Pass (in the south). These points function as gateways for two major corridors into the East County; an east/west route (I-580) and a north/south route (I-680) which are supported by 50 arterial or collector roads.

Interstate 580 (I-580), an eight-lane freeway approximately 22 miles in length through the planning area, bisects the northern portion of the East County and extends from I-205 near Tracy westward to SR 238 in Hayward. It is the principal connector of the Central Valley cities (via Routes 5 and 205) and the East Bay area. Traffic volumes on I-580 average from 90,000 to 145,000 vehicles daily with westbound A.M. peak hour volumes from 4200 to 6700 vehicles.

There are 14 interchanges along I-580, including, from east to west: Grant Line Road, North Flynn, Greenville Road, Vasco Road, First Street, North Livermore Avenue, Portola Avenue, Airway Boulevard, El Charro Road, Santa Rita Road/Tassajara Road, Hacienda Drive, Hopyard Road/Dougherty Road, I-680, and San Ramon Road/Foothill Road.

Interstate 680 (I-680), extending approximately 15 miles through the planning area, is a four- to six-lane freeway which extends from Interstate 280 (I-280) and U.S. 101 in San Jose to Interstate 80 near Fairfield. Route I-680 connects the Livermore-Amador Valley to Contra Costa County to the north and Santa Clara Valley to the south. This highway, the only officially designated state scenic highway in the planning area, is protected by local scenic corridor programs. The freeway is the primary north/south corridor between the San Ramon/Walnut

Creek area and the planning area. This route carries between 92,000 to 106,000 vehicles daily between Sheridan Road and Contra Costa County with a southbound A.M. peak hour (3200 to 4700 vehicles).

Route I-680 has eight interchanges in the East County, including (from north to south): I-580, Stoneridge Drive, Bernal Avenue, Sunol Boulevard, Vallecitos Road (SR 84), Niles Canyon Road (SR 84)/Calaveras Road, Andrade Road, and Sheridan Road.

State Route 84 (SR 84), approximately 14 linear miles as it passes through the East County, is a two lane arterial that originates at I-580 in Livermore and follows the route of First Street, Holmes Street and Vallecitos Road continuing past I-680 into Fremont. In a regional context, the route also serves as a bypass of the I-580/I-680 interchange for travelers heading south from I-580 to I-680. Daily traffic volumes range from about 7000 vehicles (at I-680) to 26,500 vehicles (at I-580) with a westbound A.M. peak heading to I-680.

The Alameda County Congestion Management Agency (CMA) has designated I-580, I-680, and SR 84 as the Congestion Management Program (CMP) roadway network in the East County (see Figure 12). The CMP is the countywide transportation plan intended to integrate land use planning and air quality goals with transportation planning. The CMA has established that a threshold level of service (LOS) E for congested travel conditions on these roadways must be maintained in order to continue to receive state funding.

Arterials and Collectors. There are 50 arterial and collector roads in the planning area (see Table C-1 for list) Those 20 located in the unincorporated areas total 114 linear miles. Significant among these routes are Vasco Road, which provides access from Livermore to and from eastern Contra Costa County, Tassajara Road/Santa Rita Road and Dougherty Road, which provide access to the I-680 corridor in Contra Costa County, Stanley Boulevard, which connects Livermore and Pleasanton, Livermore Avenue, connecting Livermore and the North Livermore area, and San Ramon/Foothill Road, connecting Dublin and SR 84.

### **Bus Service**

Bus service in the East County is provided by three entities; the Livermore-Amador Valley Transit Authority (LAVTA), BART Express which provides feeder bus service to BART stations, and private shuttle services.

The Livermore-Amador Valley Transportation Authority (LAVTA) provides the WHEELS system bus transit service within the cities of Dublin, Pleasanton, Livermore and some unincorporated sections of the East County. LAVTA basic service offers 10 fixed bus routes in a 42 square mile service area providing service to approximately 2,300 daily riders. LAVTA offers paratransit service to the elderly and handicapped.

BART Express bus service serves areas within the BART District not served by the rail system. The three cities in the East County are served by six bus lines. The "UL" line connects Lawrence Livermore Laboratory, Livermore, and Dublin with the Bayfair BART station in San Leandro. The "U" line connects Pleasanton and Dublin with the Hayward BART station. The



"UP" line connects Pleasanton and Dublin with the Bayfair BART station. The "UX" line connects the Hacienda Business Park in Pleasanton directly to Bayfair BART. The "DX" line connects the Hacienda Business Park to the Walnut Creek BART. The "D" route provides service between Dublin and the Walnut Creek BART station. Patronage, about 500 to 600 per day per line except for 50 on the UX line, has increased annually from two to five percent on average since 1987.

The other commuter bus service runs to Lawrence Livermore Laboratory for its employees from Stockton. Similar service to and from Modesto is under consideration.

### **Carpooling (Park & Ride)/Vanpooling**

Carpool and vanpooling is available through RIDES which provides personalized computer matchlisting. Currently there are no park and ride facilities, except for BART express in Livermore and the Hacienda Business Park in Pleasanton, or high-occupancy vehicle (HOV) lanes within the planning area.

### **Bikeways**

Bikeways generally include all facilities that explicitly provide for bicycle travel from fully grade-separated facilities (Class I), to striped lane for one-way bike travel on a street (Class II), to simple signed streets (Class III). Within the East County, there is an extensive network of existing bicycle routes interconnecting the cities with Castro Valley and San Ramon. These bikeways include both on-road and off-road facilities which are operated and maintained by the County, cities, and park districts (see Figures 13 and 14).

### **Rail**

Although presently no passenger rail system exists within the East County, there is a growing potential regarding the viability of a commuter rail system by the conversion of the existing SPRR freight route over the Altamont Pass. A study by the San Joaquin Council of Governments is under way to determine the potential for rail commuter service using the existing SPRR line from Stockton to Union City. Jurisdictions in Alameda County have identified the potential for light rail transit (LRT) along the SPRR and UPRR corridors and recommend protecting SPRR rights-of-way as possible future transportation corridors. In an effort to provide future commuter rail service, the County has acquired large segments of railroad right-of-ways along the existing SPRR and UPRR lines. (see Figure 11) These would provide three corridors for future rail transit and include the segment from San Joaquin County west to Greenville Road, from Contra Costa County south to Stanley Blvd (paralleling the I-680 corridor), and from Mission Street in Fremont to Greenville Road in Livermore. The County is in the process of acquiring the segment from First Street to Murrieta Boulevard in Livermore. As noted below, BART plans to begin rail service to the Dublin and Pleasanton area by 1995.

## Roadway Demand and Capacity

Traffic volume is measured by average daily traffic (ADT) and peak hour volumes. Average daily traffic is the total number of vehicles on a roadway, in both directions, on an average day. Peak hour traffic figures reflect the total number of vehicles on a roadway during the busiest hour of the morning or the afternoon. Generally, peak hour occurs between 7:30-8:30 A.M. and 4:30-5:30 P.M. and usually constitutes 8 to 12 percent of ADT. Traffic volumes for the freeways, arterials and collectors are outlined in Table C-7 and illustrated in Figure 15.

Traffic congestion is commonly measured through two means: 1) level of service (LOS), a scale ranging from A to F (see Table C-3 for details); and 2) volume-to-capacity ratios (the volume of traffic divided by the capacity of the roadway segment or intersection for a certain period of time--usually the peak hour).

Tremendous growth in ADT volumes throughout the planning area has occurred from 1980 to 1990. On I-580, the highest level of ADT volume in 1990 was in the Pleasanton area where volumes averaged between 125,000 to 135,000 vehicles. In the Altamont Pass area, average daily traffic volume on I-580 increased 136 percent between 1980 and 1990 (to 91,000 vehicles). Daily traffic volumes increased at an even faster pace on I-680 over the same time period. In the Dublin area, ADT volumes increased 147 percent (to 106,000 vehicles) while in the Pleasanton area, I-680 experienced a 114 percent increase (to 86,000 vehicles). Along SR 84, ADT volumes increased 80 percent (to 15,000 vehicles) near I-680 and 47 percent (to 11,000 vehicles) near Vineyard Avenue in Livermore. This route is a two-lane rural collector with a capacity of between 11,000 and 16,000 vehicles. Several segments are at capacity in Livermore and approaching capacity west of Livermore.

Peak hour volumes, like ADT volumes, have increased significantly since 1980. By 1990, peak hour volumes on I-580 grew to 5,400 at Altamont Pass Road, 6,000 to 9,700 in the Livermore area, 10,000 to 11,000 in Pleasanton, and to 10,000 west of Pleasanton. Although peak hour volumes grew by over 95 percent, these levels account for 50 percent to 78 percent of capacity along this route. Along I-680, peak hour volumes ranged from 7,400 to 8,500 vehicles in the Dublin area and 5,400 to 6,400 through Pleasanton. Under 1990 conditions, I-680 was at approximately 75 percent capacity southbound and 60 percent northbound during the A.M. peak hour.

Acceptable level of service existed on most roadways in the planning area during the A.M. peak hour. However, approximately 10 percent (42 miles) of the roadways exhibited severe congestion (LOS E or F) during the A.M. peak hours in 1990. (CMA, March 17, 1992) Severely congested segments (LOS E or F) were evident along westbound SR 84 in the Livermore area and most of Vasco Road southbound to I-580. These conditions are indicated on Figure 15. Similar conditions are evident during the P.M. peak period although the affected lanes are in the opposite directions.



### **Commuting Patterns**

The 1990 Census data indicates significant changes in commuting trends in the East County Area since 1980. The number of residents who travel to work increased 52 percent while the population grew by only 30 percent. About 73 percent (50,221) of the approximately 69,000 workers in the three cities who travel to work commuted away from their city (up from 50 percent in 1980). Of that amount, 40 percent (19,851) traveled outside the County boundaries. Commute times slowed by one minute for an average commute time of 26 minutes for East County residents.

More commuters are driving to work alone. In 1990, 83 percent (57,622) of the workers who travel to work drove alone (up from 72 percent in 1980). By contrast, one percent (625 workers) of the workforce used public transit (down from three percent). Carpooling decreased in number (14 percent to 7,618) and in total commuter share (to 11 percent). Walking and bicycling to work as a whole also declined from six to four percent.

A significant number of people employed in the planning area commute from San Joaquin and Stanislaus Counties over the Altamont Pass where more affordable housing relative to the Bay Area housing market is found. A recent study by DKS Associates determined a three-hour P.M. peak period volume of 12,250 heading east with 83 percent (10,167) represented by homebased work trips. Approximately 43 percent (4,370) commuted to jobs in the East County, while 25 percent commuted to Contra Costa County or other Alameda County areas, 16 percent to Santa Clara County, and only five percent into San Francisco County and San Mateo County. For Altamont Pass commuters, about 56 percent commuted roughly one hour and almost 25 percent for more than two hours. Two-thirds of commuters drove alone, while 24 percent rode in two-person carpools. The average vehicle occupancy rate was 1.5 persons/vehicle for these commuters.

The capacity of the four gateways formed by I-580 and I-680 (augmented by Vasco Road and SR 84) indicate the total potential commuting workforce into and out of the planning area. In 1989, about 49,000 workers passed through the four gateways during a three-hour peak period. (EPS, 1989) Approximately 79 percent of these workers (39,000) commuted to work in the Tri-Valley area (which includes the planning area as well as San Ramon and Danville). This number is estimated to be about 46 percent of the future capacity of the gateways assuming all planned improvements and BART service to Livermore are realized. Not surprisingly, more commute from the Central Valley areas (34 percent) than from the other three gateways. From the west, 24 percent travel eastbound on I-580 into the planning area, 22 percent from the south (I-680 northbound at the Santa Clara County border), and 20 percent from the north (I-680 southbound at the border of Contra Costa County). The level of pass-through commuting is most evident on I-580 from the Central Valley (55 percent). On the other hand, 85 percent of the commuters at the northern and the western gateways and 95 percent through the southern gateway work within the Tri-Valley area. Gateway capacity data are summarized in Table C-6.



## **Transportation Improvement Projects**

The planning and programming of transportation improvements requires coordination between transportation agencies at the city and county (CMA), regional (MTC) and state (California Transportation Commission) levels of government. Lists of projects from cities and the county are submitted to MTC, the regional transportation agency, which reviews each project to assess whether it meets regional transportation goals. The list of prioritized projects then is submitted for inclusion in the Regional Transportation Improvement Program (RTIP) and eventually the seven-year State Transportation Improvement Program (STIP) or the five-year interstate Transportation Improvement Program (TIP). Capital improvement programs of the CMA are concerned with countywide LOS and city proposed projects, the MTC focus on increasing roadway capacities and peak hour person-trips, transit extension, and improving air quality, and Caltrans' programs center on interregional roads, intercity rail, and soundwall programs. In addition, city and county general plans provide the underpinnings for transportation studies and future programmed improvements. Current projects are described below.

When programmed improvements are realized over the next 20 years, the transportation network into the planning area will have capacity for 84,000 vehicles, or about 114,000 commuters, during an average three-hour peak period (105,000 by roadways and 9,000 by rail) (EPS, 1990). Assuming 21 percent of the trips will pass-through, about 66,600 vehicles (92,300 workers) could be imported to the Tri-Valley job market. If the programmed and proposed improvements are realized, most roadway segments are expected to be within acceptable levels of service (up to LOS E, although stop and go) during the A.M. peak period but unacceptable (LOS F) during the P.M. peak periods.

### **Programmed Transportation Improvements**

Several transportation improvements in the East County are scheduled for construction in the near future. These improvements include projects coordinated by the Cities of Pleasanton, Livermore, and Dublin with county and regional agencies. These projects, outlined in Table C-5 and illustrated on Figure 16, are described below.

I-580. On I-580, the most significant programmed improvement is a new interchange planned in Livermore at Collier Canyon Road/Kittyhawk Road. Interchange improvements for I-580 are programmed for locations in Livermore (at 1st Street and Airway Blvd) and in Dublin (SB I-680 to EB I-580). Although the I-580 corridor is expected to remain 8 lanes, I-205 from it's junction with I-580 to the San Joaquin County border (to I-5) is programmed to be widened from four to six lanes although estimates of completion are at least 10 years. The widening of I-205 from the Alameda County line to the junction of I-5 will be the top priority project in the San Joaquin County 1992 STIP proposal. Caltrans intends to eventually widen I-580 to 10 lanes from Vasco Road to the I-680 interchange although no precise timetable has been specified, according to *Route Concept Report, Route I-580*, 1985. Route Concept Reports are preliminary long-range improvement concepts which are neither funded nor adopted.

I-680. Two major improvements include widening from six to eight lanes (for two HOV lanes) from I-580 to Rudgear Road in Contra Costa County, and adding a connector between SB I-680

and EB I-580. Route I-680 is programmed by Caltrans in the Route Concept Report for widening from 4 to 10 lanes (from Route 262 in Santa Clara County to SR 84) and from 4-6 to 8 lanes from SR 84 to and past the Contra Costa County border.

SR 84. SR 84 is programmed for significant improvements. These include widenings in Livermore (to six lanes from Portola to I-580, and to four lanes from Portola Avenue to Scott Street), construction of a two-lane highway along the western edge of Livermore (Isabel Avenue from Concannon to Las Positas Blvd) and curve modification (.8 mile east of I-680 to 1.9 miles east of I-680). More significantly, the Caltrans Route Concept Report for SR 84 outlines the state's long-range (1985 to 2005) plan to reconstruct the SR 84 segment between I-680 at Scotts Corner and I-580 at Livermore to six-lane freeway status. In addition, the development concept indicates an eventual extension of the SR 84 freeway at four to six lanes from Livermore to Brentwood in Contra Costa County.

Vasco Road. Construction of the Vasco Road realignment project, as part of the Los Vaqueros Reservoir project, is scheduled to begin in 1993. The Alameda County portion includes an eastward realignment of Vasco Road, starting two miles south of the Contra Costa County border and continuing to (and beyond) the border.

Local Arterials. In the Dublin area, Dougherty Road is to be widened from four to six lanes (between I-580 and the SPRR), and Dublin Boulevard is also scheduled to be widened from four to six lanes (from Donlon to Village Parkway). In Livermore, signals are to be installed at the intersection of Murrieta Boulevard/Portola Avenue.

Locally planned (but not yet funded) roadway projects are submitted to the MTC by the CMA for future inclusion on RTIP. These projects are shown in Table C-2.

### **Programmed Capital Improvements**

The Transportation Improvement Program (TIP) is a five-year capital investment program of transportation projects that involve any federal action. It sets forth the investment priorities of the MTC for transit, transit related improvements, mass transit guideways, and highways. The TIP is the MTC's principal means of achieving federally assisted long term transportation objectives. Projects include the Traffic Systems Management (TSM) Programs and the State/Local Transportation Partnership Program. The current TIP is outlined below.

The State Transportation Improvement Program (STIP) is a seven-year plan which lists projects, proposed in the RTIP by MTC and in PSTIP by Caltrans, approved for state and local funding by the CTC. Most of these projects will become part of the TIP. The projects being funded are outlined in the following table.

The Regional Transportation Improvement Program (RTIP) is the region's proposed seven-year transportation improvement program for highways, state-funded mass transit guideways, general aviation and toll bridge projects. The RTIP, prepared by MTC, is submitted to the CTC for potential inclusion in a future STIP.



Locally, the Alameda County CMA Capital Improvement Program (CIP) is a seven-year investment strategy to support the goals of the CMP on all proposed projects that help meet prescribed LOS or transit standards. The CIP includes proposed projects submitted to MTC for inclusion in the RTIP, projects competing for the statewide TSM funds, and other projects affecting the CMP roadway network. The CIP is a subset of the projects being considered for the year 2010 as part of the CMA's Countywide Transportation Plan. These candidate projects are the basic inventory of projects from which MTC's RTIP is developed for the County.

**BART.** The BART Board of Directors has approved the extension of BART rail to the Dublin/Pleasanton area which will be constructed in the median of I-580 and will have stations in the Dublin/Pleasanton area. The West Dublin/Pleasanton station will be located west of the I-580/I-680 interchange and the East Dublin/Pleasanton station will be located near the I-580/Hacienda Drive interchange. Service is anticipated to begin in 1995. Phase II would extend BART along I-580 to Livermore by 2010. BART, in cooperation with the City of Livermore, has identified a West Livermore station at I-580 near Airway Boulevard and Kitty Hawk Road, and an East Livermore station near the intersection of Greenville Road and I-580. BART has acquired land for the proposed West Livermore station, and has built an interim 200-space park/ride facility at this site.

**Bus Service.** Programmed capital improvements include the purchase of three paratransit vans and the construction of a bus transfer center in Livermore (at Stanley Blvd/Fenton Street). LAVTA's Short-Range Transportation Plan (SRTP) recommends several modifications to service to be implemented in September 1990: increasing peak period service on roughly half of the LAVTA fixed routes; and providing direct peak period service to Bishop Ranch from park-and-ride lots at West Livermore and Hacienda Business Park. In addition, LAVTA is studying the feasibility of replacing its fixed route service with dial-a-ride service during mid-days and Saturdays. Annual passenger increases of about 12 percent are expected from 1992 through 1996 reflective of 34 new replacement and expansion buses (MTC, *TIP: Transit Element*, 1991).

**Bikeways.** Bike routes planned by the three cities in the East County include a connector between Livermore and Dublin north of I-580 and one between Pleasanton and western Vallecitos Road (see Figure 14). MTC has allocated federal money from the new federal Intermodal Surface Transportation Efficiency Act for several improvement of miles of bicycle paths and lanes in the planning area.

### **Proposed Transportation Improvements**

General Plans (and General Plan Amendments) of the three cities, the three adjacent counties and the MTC Regional Transportation Plan propose several transportation improvements that would have local and regional consequences. These are outlined below and indicated on Figure 17.



Cities

The Dublin General Plan (and proposed East Dublin General Plan Amendment) proposes the following improvements:

- Dublin Boulevard--extend as a six-lane boulevard from Dougherty Road east to connect to North Canyons Parkway in Livermore.
- Fallon Road--extend north to connect to Tassajara Road.
- Fallon Road/I-580--upgrade interchange.
- I-580--widen to 10 lanes between Tassajara Road and Airway Boulevard.
- Construct an I-680 interchange at or near Dublin Boulevard.
- Dougherty Road--redesign as a six-lane arterial.
- Doolan Canyon Road--extend west to connect to Tassajara Road.

The Pleasanton General Plan proposes the following improvements:

- El Charro Road (from I-580 to Busch Road)--construct a four- to six-lane road.
- Stoneridge Drive (from Foothill Road to El Charro)--construct a six-lane road.
- SR 84 (Vallecitos Road)--widen to four lanes between I-680 and Stanley Blvd. and to six lanes between Stanley and I-580.
- Foothill Road (from I-580 south to Castlewood Drive)--widen to 3-6 lanes.

The Livermore General Plan proposes the following improvements:

- North Livermore Avenue (north of I-580)--widen to four lanes from I-580 to North Canyons Parkway.
- North Canyon Parkway--construct a two- to six-lane roadway from Vasco Road westward to Dublin.
- Isabel Parkway (SR 84 Extension south of I-580)--construct a four- to six-lane limited access expressway from I-580 south to Vineyard Avenue, then a two-lane road to Vallecitos Road.
- Isabel Parkway (SR 84 Extension north of I-580)--this segment should connect to the present Vasco Road alignment.
- Vasco Road--widen to four lanes between Patterson Pass Road to Scenic Avenue (6 lane r-o-w) and to 4-6 lanes from Scenic Avenue to Isabel Parkway.
- Las Positas--extend westward to connect with Stoneridge Drive in Pleasanton.

County

Draft proposals of the CMA's *Alameda Countywide Transportation Plan*, coordinated with proposed projects of other agencies, include the following draft recommendations.

- Dublin Boulevard--widen from four to six lanes between I-680 and Dougherty Road, and build a six-lane divided arterial between Dougherty Road and Vasco Road.
- Build new freeway-to-freeway ramps directly connecting I-680 southbound to I-580 eastbound and on/off ramps connecting I-680 to Dublin Boulevard.

- I-680--widen by construction of one HOV lane in each direction between I-580 (near Contra Costa County) and Route 237 (in Santa Clara County) and one mixed-flow lane in each direction between Route 262 and Route 84 (in Sunol).
- SR 84--Build new six-lane freeway between I-580 west of Livermore and I-680 in Sunol.
- Express Bus Service--deploy five new express bus routes from residential areas in the East County to employment centers in other portions of Alameda County, as well as Contra Costa and Santa Clara counties.
- BART--extend service to Livermore (west and east Livermore locations).
- Intercity Commuter Rail Service--operate commuter trains between San Francisco/San Jose and the San Joaquin Valley.

### Regional

MTC's 1991 *Regional Transportation Plan* recommends roadway improvements to:

- I-580--upgrade the I-580/I-680 interchange connectors.
- I-680--widen by 2-4 lanes including 2 HOV lanes from I-580 to Rudgear Road.
- SR 84--extend as a two-lane expressway along Isabel Avenue from I-580 to Vallecitos Road and relocate and straighten Vasco Road alignment with no widening.
- BART--extend service to East Livermore.
- LAVTA- provide service to all four BART stations.

Several transportation improvements are proposed in the surrounding counties that would generally benefit the eastern portion of the planning area. The draft *San Joaquin County General Plan 2010* proposes widening I-205 from four to six lanes with structures for 8 lanes from I-580 to I-5. Even though a total of eight lanes is projected by 2010, congestion is expected to be at LOS D. The draft *Contra Costa County General Plan* proposes realignment of Vasco Road as a two-lane "Delta Expressway" (as a regional transportation corridor from Antioch through Alameda County), and widening Dougherty Road to 4-6 lanes.

### **Transportation Studies in Progress**

Several transportation studies are in progress that could provide the groundwork for significant long range changes to the local and regional travel and commute patterns. These include:

Countywide Transportation Plan. The CMA's Transportation Plan project, due in 1992, presents a modelling of various transportation development alternatives to determine their impact upon the transportation network in the year 2010. This project considers BART extension to Livermore, upgrade of SR 84, and acquisition of right-of-ways for development of light rail transit (LRT) via existing UPRR lines.

East County Corridor Study (SR 84). This study considers connecting I-580 in Livermore with SR 4 and SR 160 in Antioch as a result of the Kellogg-Los Vaqueros Reservoir project by the Contra Costa County Water District. Being considered is a 30 mile Delta Expressway which would begin in Antioch at SR 4 and SR 160 southward into Alameda County via the Vasco Road realignment. Vasco Road would remain as it is except for about two miles from the Contra



Costa County border where it will be realigned eastward. The realignment is illustrated in Figure 16.

Mid-State Tollway. AB 680, passed in 1989, allows four toll road demonstration projects in the state. In 1990, the state announced that one of the projects will be the Mid-State Tollway traversing from Vacaville southward to Sunol. Part of this tollway would span the same alignment of the East County Corridor study but extend farther north and south.

Tri-Valley Regional Transportation Plan. The Tri-Valley Transportation Council is currently developing a work plan for preparing a transportation plan for the Tri-Valley region. The plan would integrate and coordinate the various transportation planning efforts of the counties and cities in the Tri-Valley.

Altamont Pass Rail Corridor Study. The Altamont Policy Advisory Coalition was formed in June 1992 to look for alternative passenger rail lines between the Central Valley and the Bay Area. The 18-month study, by Parsons-Deleuw for the San Joaquin Council of Government, will study the feasibility of a rail commuter line on the existing SPRR Altamont right-of-way from Stockton over the Altamont Pass to Union City with possible stops in Livermore and Pleasanton. The study will also consider service from Concord to Pleasanton along the SPRR San Ramon Branch right-of-way. The study is tentatively due in 1992.

### **Projected Year 2010 Conditions**

The Alameda County CMA has projected traffic conditions throughout the planning area for the year 2010 (see Table C-8 and Figure 18). The 2010 scenario assumes approximately 94,370 households, a population increase of 88 percent (to 250,700 residents), and a 118 percent increase in the number of jobs (to 150,700) in the East County. The scenario also assumes a 56 percent population increase in San Joaquin County and a 32 percent growth in the number of jobs in the Bay Area. Also assumed is the completion of all programmed transportation improvements and the construction of the major proposed improvements including:

- North Canyons Parkway--extension of Dublin Boulevard as a four- to six-lane connector between I-680 and Vasco Road.
- BART--commuter service to Dublin/Pleasanton.
- I-680--one HOV lane in each direction between I-580 north into Contra Costa County.
- SR 84 (Isabel Expressway)--new four-lane expressway between I-580 on the western edge of Livermore and I-680 in Sunol.
- Commuter/Intercity train service--trackage and stations to operate commuter trains through Alameda County between the Central Valley and San Jose.
- Bus Service--deployment of five new express buses and institution of 15-minute frequencies during peak periods.

Projections show that by 2010 about 23 percent of the freeways and 15 percent of the arterials will be severely congested (LOS E or F). Most westbound sections on six regional roadways will be congested during morning peak hours. Route I-580 westbound will be at LOS E from SR 84 in Livermore to I-680. SR 84 will be LOS E from the Isabel Expressway (SR 84) and



LOS F westward from Foothill Road. Stanley Boulevard, between Livermore and Pleasanton to I-680, will be at LOS F in the westbound direction. The proposed extension of the North Canyons Parkway, which will parallel I-580 to the north, is expected to operate at LOS E to F in the westbound direction near Livermore and west of Tassajara Road. Vasco Road is projected to be at LOS E to F as it enters Alameda County and passes southward of I-580. Additionally, on southbound I-680, congested segments are expected to extend from the Contra Costa County line to Stoneridge Drive in Pleasanton. Conditions could be expected to be slightly worse for the afternoon peak hour but in the opposite directions.

Projections indicate that there would be capacity at the I-580/I-680 gateways of the Tri-Valley area for 84,000 vehicles (and approximately 105,000 workers) during average three hour peak periods. (EPS, May 1992). This assumes construction of all planned improvements. Assuming 1989 pass-through factors and likely distribution of future labor force in the Tri-Valley, approximately 83,250 workers (66,600 vehicles) could be expected to commute to work in the Tri-Valley area, accounting for only 68 percent of the workers needed under city General Plans. (EPS, June 1992); this would translate to an unrealized employment demand of 40,000 workers.

Forecasts for the year 2010 indicate that transit use and carpooling will become more prevalent, accounting for about 22 percent of commuters within the planning area and 34 percent of commuters to and from the East County (CMA, March 17, 1992). However, vehicle miles traveled on congested freeways and arterials is anticipated to increase 271 percent (to 245,700 miles) from 1990 levels. Approximately 34 percent of vehicle miles traveled on freeways and 48 percent on arterials will be on severely congested conditions.

## ■ TRENDS

### **Increase in Roadway Congestion**

Severe congestion is projected to increase between 1990 and 2010 affecting 77 miles of freeways and arterial. The CMA has projected that by 2010 most regional freeways and highways will be operating unacceptably during peak hours particularly during the P.M. peak period. This assumes construction of programmed improvements as well as the North Canyons Parkway, the Isabel Expressway, and the extension of BART service to Livermore. Route I-580 will be at LOS F from SR 84 in Livermore to I-680. SR 84 is projected to be at LOS E from Livermore to I-680. The proposed North Canyons Parkway, which will parallel I-580 to the north, will be at LOS F near Livermore and west of Tassajara Road. Areas of intolerable delays are anticipated to be evident on I-680 (between Contra Costa County and Stoneridge Drive) and Vasco Road southbound from Contra Costa County.

### **Increasing Disparity Between the Location of Jobs and Housing**

The planning area is expected to develop faster as a population hub than as an employment center, i.e., job growth is not expected to be large enough to fully supply the local employment demands of the East County. Growth projections show that the planning area will grow by 118,000 new residents and 82,000 new jobs during the 20 year period between 1990 and 2010

(ABAG, *Projections '92*, 1992). In 1980, approximately half of the employed residents of Livermore-Amador Valley worked in the area. By 1990, 73 percent of workers left their cities for work elsewhere indicating a growing locational disparity between jobs and housing. Trends to 2010 indicate that although the rate of growth in commuter traffic within the East County may decrease, the growth levels of regional traffic will increase.

### **Increase in Commuting Distance and Travel Time**

The average number of miles and hours traveled by commuters is expected to increase. Along SR 84, the vehicle miles traveled (2,993,878) is projected to increase about 60 percent by the year 2010, with an 85 percent increase in Vehicle Hours Traveled (to 74,223) (MTC, *TIP FY 92-96*, 1991). Vehicle miles traveled in severe congestion is expected to increase almost three-fold by 2010 along with a concomitant increase in vehicle hours traveled.

### **Increase in Single Occupant Vehicle Transportation**

Approximately 83 percent of the East County commuters drove alone in 1990 (up from 72 percent in 1980). Transit and carpooling decreased from 22 percent in 1980 down to 13 percent by 1990. However, given programmed transportation improvements, projections by CMA to the year 2010 indicate a reversing trend. By that time, 22 percent are expected to carpool or use public transit while 78 percent will still be driving alone.

### **Increase in Daily Commuter Trips**

The number of daily person trips by residents is anticipated to increase by 55 percent over current figures by the year 2010. Sixty-nine percent of the new daily person-trips are expected to be made to locations within Alameda County, 12 percent to locations in Santa Clara County, 9 percent to Contra Costa County, and seven percent through the Altamont Pass to destinations east of Alameda County.

Daily person trips made by in-commuters to the planning area are expected to increase by 53 percent or 98,000 trips from 1990. Fifty percent of the new trips are expected to be made by residents of central Contra Costa County, 32 percent from the other areas of Alameda County, and 18 percent by residents living east of Altamont Pass.

### **Increasing Importance of Traffic Volume Management as a Regional Issue**

Even with roadway improvements and an effective transportation system management program to reduce traffic volumes in the East County, the land use and transportation policies of surrounding counties will exacerbate local traffic and air pollution levels. San Joaquin County's land use projections indicate that the County could grow from the current 490,000 population to between 750,000 and 830,000 residents by the year 2010. The Tracy area alone could grow from 43,000 people to over 168,000 by 2010, if the proposed Mountain House and New Jerusalem projects are built as proposed. ADT volumes in the Tracy area would amount to 142,500 vehicles on I-205 and 54,500 on I-580 before it joins I-205. The commuter volume on I-205 is anticipated to increase to about 65,000 assuming construction of the new towns of



Mountain House and New Jerusalem. Even with currently planned roadway improvements, I-205 is projected to experience intolerable delays (LOS E or F) by the year 2010 ABAG projections for San Ramon in Contra Costa County show population and the number of jobs increasing by 60 percent by 2005. (EIP, September 1991)

## ■ PLANNING ISSUES

### Transportation Improvements

Tremendous congestion is projected to occur in the East County by 2010. In order to relieve congestion within the planning area, construction of all programmed and proposed improvements will be needed. This includes freeway improvements, the two parallel roads connecting Livermore to Pleasanton and Dublin, the construction of the Isabel Expressway, and the extension of BART service to Livermore. However, projections by CMA show that even with the realization of all programmed and many proposed transportation improvements, P.M. peak period traffic will overwhelm capacity on the major thoroughfares. Even with construction of programmed and several proposed improvements, there will be a substantial need for additional transportation improvements.

### Traffic Mitigation

Mitigations that consider both highway and non-highway improvements and services offer the greatest opportunity for realization. Special attention should be given to the development of alternative solutions to circulation problems which do not rely solely on increased highway construction but rather on methods to promote non-auto transportation uses. This includes traffic demand management, coordination of employment and housing, public transit development, and traffic reduction schemes such as Rideshare, and Vanpool, Park and Ride. Other mitigation measures being considered by Caltrans and MTC include ramp meterings, HOV lanes, a traffic operations system, motorist information and management systems, and establishing a growth monitoring and management program that coordinates land use and public facility planning on a subregional level.

One design strategy to accommodate growth within the County while maximizing its open space quality and minimizing auto use is the transit-oriented development (TOD) concept, as outlined in the Sacramento County General Plan. This idea attempts to address urban sprawl, traffic congestion, non-attainment of regional air quality standards, and the growing demand for housing opportunities. In the TOD strategy, new moderate and high density housing as well as new public uses and a majority of neighborhood-serving retail and commercial uses would be concentrated in mixed use developments located at strategic points along the regional transit system. Transit-oriented developments are mixed-use neighborhoods, between 20 and 160 acres in size, which are developed around a transit stop and core commercial area. The entire TOD site would be within an average one-fourth mile walking distance of a transit stop. Better residential design via TOD and urban compact form may serve to further the competitive advantage of the East County for regional development. For greater detail, see *Transit-Oriented*



*Development Design Guidelines*, prepared by Calthorpe Associates for the Sacramento County Planning Department (September 1990).

### **Increasing the Demand for Alternative Transportation Modes**

Increasing the demand for alternative transportation modes must be met by increasing supply and providing incentives to increase patronage. Incentives to use public transit could include transit companies offering discounts to residents to purchase wholesale transit passes. Off site employers could increase employees' savings by subsidizing part of the cost. An employer provided cash travel allowance, equivalent to the market price of parking, is estimated to increase transit ridership. Transit ridership could be even greater when a non-taxable cash allowance is offered. Emission, or smog, fees attempt to increase transit use while recovering more of the external costs associated with auto use by assessing fees according to the amount of emissions an auto produces. Although not used in the U.S., they could be coordinated with the Clean Air Act.

### **Planning Integration**

Increasingly, the need to better integrate decisions about development and transportation is being recognized. The future extension of BART to Dublin and Livermore combined with the determination of commuter rail potential along the abandoned railroad rights-of-way in eastern Alameda County provide the opportunity to review and modify development policies for local and regional areas. Higher density residential land use combined with more mixed-use development patterns than is currently planned may be in order to take advantage of these transportation corridors.

Better coordination among plans and programs should produce better transportation decisions, investments, and strategies. However, this assumes some common, standard basis for evaluating the merits of different plans and programs. It also assumes a way to compare recommendations and make tradeoffs between plans and programs. For example, air quality related project/program recommendations are measured against emission reduction potential, CMP outcomes are rated for their achievement of traffic LOS, Caltrans projects are ranked according to improved vehicle flow, and transit projects are ranked according to ridership increases and farebox recovery. Additionally, circulation elements of general plans are not required to have any necessary relation to larger scale transportation plans, such as CMPs, SRTPs, and the RTP. Establishing some degree of standard, multi-modal performance-based evaluation procedures and criteria would be instrumental in improving effective plan and program coordination.

### **Land Use and Transportation: Jobs/Housing Balance**

To the extent that workers must be imported and exported to and from distant major employment centers, the imbalance between employment and housing potential can strain transportation infrastructure. At some point, when housing or transportation resources are used to capacity, the inability to provide sufficient labor resources will constrain further employment growth. The consequences of not developing adequate housing opportunities to match the employment opportunities being generated in the planning area are obvious; the practice of long distance

commuting will continue further congesting the freeways and adding to the financial burden required to improve the transportation system. Recognition of the jobs/housing balance in this context is needed at the inter-jurisdictional level.

### **Air Quality**

The California Clean Air Act (CCAA) of 1988 grants new authority to regional air districts to adopt and enforce transportation control measures (TCM's) to cut vehicle emissions by reducing reliance on single-occupant auto trips and otherwise modify roadway vehicle use habits. The CCAA mandates enforcement of transportation control measures (TCMs). Among other things, TCMs will require substantial reduction of the growth rate of vehicle trips and vehicle miles traveled, an average vehicle ridership of at least 1.5 persons (including transit) during weekday commute hours by 1999, and an overall 33 percent increase in local bus service.

Although transit use and carpooling are anticipated to increase by 2010, these will be far outpaced by vehicle miles traveled and vehicle hours traveled on congested highways. The resulting level of air pollutants, particularly carbon monoxide, is projected to significantly increase (14 percent) during an average A.M. peak hour.

### **Self-Help**

Local funding towards satisfying transportation needs are becoming even more important in recent periods of constrained federal and state funding. According to the *1992-1996 TIP*, Alameda County presently contributes 35 percent of its total transportation budget for projects on the state highway system, compared to 38 percent for the entire MTC region. While the County has passed a 1/2 cent sales tax measure, significant funds for transportation are raised through developer fees. An aggressive policy toward rewarding counties that make significant local contributions could encourage other counties to pursue a similar and coordinated approach.

## **■ POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Design of transportation facilities and programs to accommodate land uses outlined in this Plan*
- *Reduction of traffic congestion levels throughout the East County street and highway system*
- *Promotion of transit, ridesharing, bicycling and walking*
- *Requiring development in unincorporated areas to include Transportation Systems Management (TSM) measures*
- *Improvement of the state and Interstate highway systems, as well as the County road system*

- *Phasing of new development to coincide with roadway improvements so that acceptable Levels of Service are met*
- *Support of transit investments as an alternative to automobile-intensive transportation improvements*
- *Completion of transit improvements to meet the demand for existing and future development*
- *Support of high-intensity development in locations convenient to public transit facilities and along transit routes*
- *Encouraging BART to locate new stations in areas that can be developed at high densities to maximize transit patronage*
- *Promoting development of transit connections (e.g. shuttle buses) between BART stations and East County communities*
- *Maintenance and expansion of bus service to meet projected demand*
- *Development of a safe, convenient and effective bikeway system which encourages increased bicycle use*
- *Development of a safe and convenient pedestrian system which links residential, commercial, and recreational uses, and which encourages walking as an alternative to driving*
- *Management, development, and conservation of land within scenic highway corridors to maintain and enhance scenic values*



TABLE C-1

**Major Arterials and Collectors in the Planning Area**

<b>Livermore Area</b>		
Airway Boulevard Las Positas Boulevard First and Holmes Streets Portola Avenue East Avenue	Alden Lane Kitty Hawk Road Murrieta Boulevard Isabel Avenue	Arroyo Road South Livermore Avenue Greenville Road Vasco Road
<b>Dublin Area</b>		
Dougherty Road Village Parkway	San Ramon Valley Road Dublin Boulevard	Amador Valley Boulevard
<b>Pleasanton Area</b>		
Foothill Road Stoneridge Drive Bernal Avenue West Las Positas Boulevard	Valley Avenue Hopyard Road Hacienda Drive Sunol Boulevard	Santa Rita Road First Street Stanley Boulevard Vineyard Avenue
<b>Unincorporated Areas</b>		
Tassajara Road Stanley Boulevard North Livermore Avenue Vasco Road Laughlin Road Greenville Road Altamont Pass Road Carroll Road Mountain House Road	Grant Line Road Midway Road North Flynn Road South Flynn Road SR-84 (Niles Canyon, Vallecitos Road) Calaveras Road Fallon Road El Charro Road	Croak Road Foothill Road Collier Canyon Road Vineyard Avenue Patterson Pass Road Tesla Road Isabel Avenue Mines Road

TABLE C-2	
Local Roadway Improvement Projects	
Location	Description
<b>Dublin</b>	
Dougherty Road	Widen from 4 lanes to 6 lanes (from I-580 to the SPRR)
I-580/San Ramon	Modify the westbound offramp and install signal
I-580/I-680	Construct hook ramps to provide access to the city of Dublin (to allow continued I-680 access)
Amador Plaza Rd/ Regional Street	Construct a 2 lane road for BART access.
<b>Pleasanton</b>	
UPRR Right of Way	Purchase 50 foot r-o-w plus easement between Valley Avenue and Stanley Blvd for future rail transit
<b>Livermore</b>	
I-580/North Livermore Interchange	Widen and install traffic signal
I-580/Greenville Road Interchange	Modify
I-580/Airway Blvd Interchange	Modify ramps and install signals
I-580/Vasco Road Interchange	Reconstruct
<b>Source:</b> Alameda County CMA, <u>Congestion Management Program</u> , 1991.	

TABLE C-3

## Roadway Level of Service Definitions

Level of Service	Volume-to-Capacity Ratio*	Description
<b>A</b>	< 0.60	Free flow, volumes and densities, high speeds. Drivers can maintain their desired speeds with little or no delay.
<b>B</b>	0.60 - 0.69	Stable flow, operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speeds.
<b>C</b>	0.70 - 0.79	Stable flow, but speeds and maneuverability are more closely controlled by higher volumes.
<b>D</b>	0.80 - 0.89	Approaching unstable flow, tolerable operating speeds which are; however, considerably affected by operating conditions. Drivers have little freedom to maneuver.
<b>E</b>	0.90 - 1.00	Unstable flow, with yet lower operating speeds and, perhaps, stoppages of momentary duration. Volumes at or near capacity.
<b>F</b>	> 1.00	Forced flow. Both speeds and volumes can drop to zero. Stoppages may occur for short or long periods. These conditions usually result from queues of vehicles backing up from a restriction downstream.

\*V/C ratio = The ratio of traffic volume to roadway capacity on a given roadway segment. Volumes adjusted using peak hour % of trucks, and peak hour factors actually observed at 35 sample locations (% trucks: 3% to 6%; peak hour factor: .83 to 1.00).

Source: *Highway Capacity Manual*.



TABLE C-4

### Estimated Lane Requirements Based on Average Daily Traffic Volume

Class	Typical Cross-Section (Range)	Levels of Service (Average Daily Vehicle Trips)				
		A	B	C	D	E
<b>Primary Arterial</b> (6 lane w/raised median)	102' to 118'	22,000	37,000	45,000	50,000	56,000
<b>Major Road</b> (4 lane w/raised median)	78' to 94'	15,000	25,000	30,000	34,000	37,000
<b>Collector</b> (4 lane w/painted median)	76' to 92'	14,000	23,000	27,000	31,000	34,000
<b>Collector</b> (4 lane)	64' to 80'	12,000	20,000	24,000	27,000	30,000
<b>Light Collector</b> (2 lane)	42' to 58'	1,900	4,000	7,000	11,000	16,000
<b>Rural Collector (Residential)</b> (2 lane)	40' to 56'	1,900	4,000	7,000	11,000	16,000
<b>Residential Street</b> (2 lane)	36' to 50'	-	-	1,500	3,500	-
<b>Note:</b>	Use only as guideline to determine number of lanes. Intersection Level of Service (LOS) analysis should be conducted to determine more accurate LOS.					
<b>Source:</b>	TJKM					

TABLE C-5

## Programmed Capital Improvement Projects

Location	Programmed Improvement	1990 LOS
<b>SR 84</b>		
Isabel Avenue from Concannon Boulevard to Las Positas Boulevard	Construct 2 Lane Highway	A/WB A/EB
.8 miles east of I-680 to 1.9 miles east of I-680	Widen Roadway and Modify Curve	E/WB C/EB
2.2 miles east of I-680 to .1 mile west of Vineyard Avenue (near Livermore)	Correct Curve	F/WB F/EB
East of North Mines Road to west of Southfront Road	Widen to 6 Lanes and Install Signal	E/WB C/EB
<b>I-580</b>		
I-580/I-205 to San Joaquin County Line*	Widen from 4 to 6 Lane Freeway	
First Street Interchange in Livermore	Modify Interchange	A/WB A/EB
Collier Canyon Road Interchange in Livermore	Construct New Interchange	C/WB A/EB
Airway Boulevard Interchange in Livermore	Modify Interchange	C/WB A/EB
<b>I-680</b>		
SB I-680 to EB I-580	Construct Connector Segment	
North of I-580 to Rudgear Road Near Dublin	Widen from 6 to 8 Lanes for HOV	A/NB C/SB
<b>Local Arterials</b>		
Dougherty Road from I-580 to the Southern Pacific Rail Road	Widen from 4 to 6 Lanes	A/NB A/SB
Dublin Blvd from Donlon to Village Parkway	Widen from 4 to 6 Lanes	A/NB A/SB
Las Positas/Murrieta Boulevard in Livermore	Install Signals	
Murrieta Boulevard/Portola Avenue in Livermore	Install Signals	
<b>Livermore Amador Valley Transit Authority (LAVTA)</b>		
Area-Wide	Purchase 3 Paratransit Vans	-
Stanley Boulevard/Fenton Street in Livermore	Construct New Bus Transfer Center for LAVTA	-
<b>Bay Area Rapid Transit (BART)</b>		
Dublin Area*	Extension from Bayfair Along I-580 to Dublin Near I-680	-
Pleasanton/Livermore Area*	Extension from Dublin to Pleasanton/Livermore Area	-

\*1992 STIP

Source: MTC, TIP FY 1992-1996, Sept. 1991.

TABLE C-6

### Gateway Traffic Analysis: Capacity Available to Serve Commuters

Future Capacity Assuming All Planned Improvements				Pass-Through Factors	Tri-Valley's Share of Gateway Capacity*		
Gateway	Vehicles (3 Hour Period)	Workers (3 Hour Period)	Distribution of All Highway Work Trips	% of Trips With Non Tri-Valley Destination	Vehicles (3 Hour Period)	Workers (3 Hour Period)	Distribution of In-Commuters
<b>From East/North East</b>							
I-580	16,500	20,625	20%	55%	7,400	9,250	11%
Vasco Road	12,000	15,000	14%	15%	10,200	12,750	15%
<b>Subtotal</b>	<b>28,500</b>	<b>35,625</b>	<b>34%</b>	<b>38%</b>	<b>17,600</b>	<b>22,000</b>	<b>26%</b>
<b>From West</b>							
I-580	16,500	20,625	20%	15%	14,000	17,500	21%
Canyon Way	2,000	2,500	2%	15%	1,700	2,125	3%
Crow Canyon	2,000	2,500	2%	15%	1,700	2,125	3%
<b>Subtotal</b>	<b>20,500</b>	<b>25,625</b>	<b>24%</b>	<b>15%</b>	<b>17,400</b>	<b>21,750</b>	<b>27%</b>
<b>From North</b>							
I-680	16,500	20,625	20%	15%	14,000	17,500	21%
<b>From South</b>							
I-680	16,500	20,625	20%	5%	15,700	19,625	24%
Niles (SR 84)	2,000	2,500	2%	5%	1,900	2,375	3%
<b>Subtotal</b>	<b>18,500</b>	<b>23,125</b>	<b>22%</b>	<b>5%</b>	<b>17,600</b>	<b>22,000</b>	<b>26%</b>
Roadways	84,000	105,000	100%	21%	66,600	83,250	100%
Rail Transit	0	9,000	n/a	0%	0	9,000	n/a
<b>Total</b>	<b>84,000</b>	<b>114,000</b>	<b>n/a</b>	<b>21%</b>	<b>66,600</b>	<b>92,300</b>	<b>n/a</b>

\*The Tri-Valley's share of capacity is equal to future capacity minus pass-through trips. Assumes pass-through trips remain at the 1989 percentage. Under 1989 conditions approximately 39,000 vehicles commute through the gateways. This is equivalent to approximately 48,750 workers and 46% of the future gateway capacity. Workers/vehicle is assumed to equal 1.25. Assumes an additional 9,000 workers would arrive via rail or transit. Assumes all anticipated improvements to the roadway network and BART service to Livermore.

Source: TJKM; Economic and Planning Systems, Inc.; Growth Inducing Impacts Analysis of Trio-Valley Wastewater Authority Export Capacity Expansion, April 1990.



TABLE C-7

## 1990 Roadway Operating Conditions

Location	ADT <sup>1</sup>	Lanes	Peak Hour (PM)	Peak Hour (AM)	LOS (AM Peak)	V/C (AM Peak)
Route 84						
Foothill Road/Palomares Road	NA	2	546/WB 593/EB	310/WB 603/EB	B/WB A/EB	.69 .48
Pleasanton-Sunol Roads/Foothill Road	13,800	2	466/WB 274/EB	521/WB 485/EB	A/WB A/EB	.28 .42
South Junction I-680/Pleasanton-Sunol Roads	6,900	2	466/WB 274/EB	525/WB 786/EB	A/WB A/EB	.28 .42
North Junction I-680 (East of)	15,100	2	753/WB 930/EB	848/WB 788/EB	E/WB C/EB	.91 .75
Vineyard Ave (West of)	11,000	2	737/WB 930/EB	948/WB 778/EB	E/WB C/EB	.91 .74
Wetmore Road/Vineyard Avenue	11,200	2	746/WB 929/EB	911/WB 755/EB	E/WB C/EB	.91 .75
Alden Lane/Wetmore Road	13,300	2	806/WB 944/EB	835/WB 691/EB	F/WB F/EB	1.49 1.2
Arroyo Road/Stanley Boulevard	27,000	4	883/WB 1004/EB	868/WB 644/EB	C/WB F/EB	.75 1.03
Portola Avenue/Arroyo Road	24,600	4	1296/WB 1448/EB	1110/WB 1323/EB	D/WB C/EB	.80 .69
Junction I-580/Portola Avenue	26,500	4	1012/WB 1149/EB	1070/WB 999/EB	F/WB F/EB	1.21 1.09
I-205						
San Joaquin County Line/I-580	65,000	4	NA	NA	NA	NA
I-580						
San Joaquin County Line/I-205	25,000	4	NA	NA	NA	NA
Grant Line Road/I-205	90,000	4-8	NA	NA	NA	NA
North Flynn Road/Grant Line Road	91,000	8	NA	NA	NA	NA
Greenville Road/North Flynn Road	92,000	8	1125/WB 4258/EB	4193/WB 1125/EB	A/WB A/EB	.52 .14
Vasco Road/Greenville Road	97,000	8	1658/WB 4350/EB	4026/WB 1271/EB	A/WB A/EB	.50 .17
SR 84/Vasco Road	103,000	8	2306/EB 4574/EB	4553/WB 2622/EB	A/WB A/EB	.56 .31

**TABLE C-7 (Continued)**

**1990 Roadway Operating Conditions**

N. Livermore Avenue/SR 84	113,000	8	1729/WB 4360/EB	4381/WB 1929/EB	A/WB A/EB	.52 .22
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Portola Avenue/ N. Livermore Avenue	117,000	8	1925/WB 4884/EB	4525/WB 2440/EB	A/WB A/EB	.54 .28
Airway Boulevard/Portola Avenue	121,000	8	3243/WB 6466/EB	6460/WB 3282/EB	C/WB A/EB	.77 .38
El Charro Road/Airway Boulevard	122,000	8	3340/WB 6626/EB	6582/WB 3449/EB	C/WB A/EB	.78 .40
Tassajara Road/El Charro Road	125,000	8	3340/WB 6626/EB	6582/WB 3449/EB	C/WB A/EB	.78 .40
Hopyard Road/Tassajara Road	135,000	8	3780/WB 6716/EB	6527/WB 4014/EB	C/WB A/EB	.77 .47
I-680/Hopyard Road	145,000	8	4501/WB 6836/EB	6719/WB 4844/EB	C/WB A/EB	.70 .52
San Ramon Road/I-680	140,000	8	4327/WB 5924/EB	6052/WB 3953/EB	B/WB A/EB	.62 .40
Palomares/San Ramon Road	135,000	8	6331/WB 6411/EB	6763/WB 5079/EB	B/WB A/EB	.63 .58

## I-680

Contra Costa County Line	106,000	6	3710/NB 3705/SB	3857/NB 4713/SB	A/NB C/SB	.58 .73
I-580/Bernal Avenue	85,000	6	3060/NB 2316/SB	2627/NB 3260/SB	B/NB C/SB	.61 .75
Bernal Avenue/Sunol Boulevard	79,000	6	3257/NB 2956/SB	2758/NB 3670/SB	B/NB D/SB	.64 .88
Sunol Boulevard/SR 84 East	82,000	6	3451/NB 3132/SB	2960/NB 3423/SB	C/NB D/SB	.72 .86
Sheridan Road/Vargas Road	92,000	6	NA	NA	NA	NA

Vasco Road
------------

I-580/Dalton Road	NA	2	1032/NB 387/SB	294/NB 1355/SB	A/NB F/SB	.28 1.25
County Line	10,023 <sup>2</sup>	2	766/NB 263/SB	215/NB 1113/SB	A/NB F/SB	.20 1.03

**Source:** CMA, preliminary data to be used for Alameda County Transportation Plan.

<sup>1</sup>Caltrans, Traffic Volumes on California Highways, 1990.

<sup>2</sup>Alameda County Public Works, 1990.

TABLE C-8

## 2010 Roadway Operating Conditions

Location	ADT	Lanes	Peak Hour (PM)	Peak Hour (AM)	LOS (AM Peak)	V/C (AM Peak)
<b>Route 84</b>						
Foothill Rd/Palomares Rd	15200	2	837/WB 1060/EB	1047/WB 687/EB	F/WB B/EB	1.04/WB .65/EB
Pleasanton-Sunol Roads/Foothill Rd	11700	2	807/WB 698/EB	550/WB 525/EB	A/WB A/EB	.54/WB .49/WB
S. Jct. I-680/Pleasanton-Sunol Rds	11400	2	807/WB 642/EB	490/WB 541/EB	A/WB A/EB	.48/WB .50/EB
I-680 (east of)	72000	4	1738/WB 4706/EB	4426/WB 1509/EB	E/WB A/EB	.93/WB .34/EB
Vineyard Ave (west of)	7600	4	246/WB 682/EB	762/WB 85/EB	B/WB A/EB	.67/WB .08/EB
Wetmore Rd/Vineyard Ave	8000	2	254/WB 714/EB	705/WB 72/EB	F/WB A/EB	1.14/WB .12/EB
Alden Lane/Wetmore Rd	6000	4	441/SB 736/NB	693/SB 91/NB	A/WB A/EB	.57/WB .08/EB
Arroyo Rd/Stanley Blvd	16400	4	1600/WB 1396/EB	1190/WB 996/EB	F/WB E/EB	1.02/WB .80/EB
Portola Ave/Arroyo Rd	39300	4	1533/WB 1861/EB	1987/WB 1516/EB	F/WB E/EB	1.19/WB .94/EB
Jct. I-580/Portola Ave	60000	6	2085/EB 3074/EB	2762/WB 1443/EB	F/WB B/EB	1.15/WB .60/EB
<b>Isabel Expressway (Proposed)</b>						
Vallecitos/Vineyard	64400	4	1502/SB 4020/NB	3658/SB 1433/NB	A/NB C/SB	.33/NB .76/SB
Vineyard/Stanley	73600	4	2320/SB 3870/NB	3401/SB 1763/NB	A/NB D/SB	.41/NB .71/SB
Stanley/Las Positas (extension)	74200	4	2539/SB 3822/NB	3922/SB 2204/NB	A/NB D/SB	.52/NB .87/SB
Las Positas/I-580	83800	4	2981/SB 3977/NB	3959/SB 3038/NB	C/NB D/SB	.71/NB .89/SB
I-580/N. Canyon Pkwy (proposed)	23300	4	646/SB 2306/NB	2648/SB 1390/NB	A/NB C/SB	.34/NB .62/SB
<b>I-205</b>						
San Joaquin County Line/I-580	142500 <sup>1</sup>	8	NA	NA	NA	NA
<b>I-580</b>						
San Joaquin County Line/I-205	54500 <sup>1</sup>	4	NA	NA	NA	NA
Grant Line Rd/I-205	NA	8	NA	NA	NA	NA
North Flynn Rd/Grant Line Rd	NA	8	NA	NA	NA	NA



TABLE C-8 (Continued)

## 2010 Roadway Operating Conditions

Greenville Rd/North Flynn Rd	126100	8	2160/WB 6801/EB	6561/WB 2160/EB	D/WB A/EB	.82/WB .26/EB
Vasco Rd/Greenville Rd	121500	8	2072/WB 6786/EB	6024/WB 1996/EB	C/WB A/EB	.75/WB .24/EB
SR 84/Vasco Rd	155900	8	3932/WB 7162/EB	6732/WB 3442/EB	D/WB A/EB	.83/WB .42/EB
N.Livermore Ave/SR 84	176900	8	4736/WB 8507/EB	7693/WB 3891/EB	E/WB A/EB	.93/WB .46/EB
Portola Ave/N.Livermore Ave	187000	8	4990/WB 8769/EB	8053/WB 4172/EB	E/WB A/EB	.96/WB .50/EB
Isabel Expwy/Portola Ave	210700	8	6371/WB 9505/EB	9253/WB 5360/EB	F/WB B/EB	1.10/WB .64/EB
El Charro Rd/Airway Blvd	186600	8	6098/WB 8846/EB	8114/WB 5293/EB	E/WB B/EB	.97/WB .62/EB
Tassajara Rd/El Charro Rd	186000	8	6141/WB 8686/EB	7846/WB 5371/EB	E/WB B/EB	.94/WB .63/EB
Hopyard Rd/Tassajara Rd	208600	8	6914/WB 9393/EB	8376/WB 5610/EB	E/WB B/EB	.95/WB .66/EB
I-680/Hopyard Rd	209700	9	7301/WB 10005/EB	9031/WB 6817/EB	E/WB C/EB	.92/WB .70/EB
San Ramon Rd/I-680	186200	9	7742/WB 9773/EB	8506/WB 5942/EB	D/WB B/EB	.88/WB .61/EB
Palomares/San Ramon Rd	176200	9	7752/WB 9226/EB	8543/WB 5680/EB	C/WB B/EB	.78/WB .64/EB
<b>I-680</b>						
Contra Costa County Line	142600	6	6045/NB 4957/SB	5295/NB 7265/SB	C/NB E/SB	.71/NB .94/SB
I-580/Bernal Ave	134200	6	6003/NB 5330/SB	4837/NB 6820/SB	C/NB E/SB	.70/NB .91/SB
Bernal Ave/Sunol Blvd	86200	6	3989/NB 3431/SB	2786/NB 5785/SB	A/NB C/SB	.41/NB .77/SB
Sunol Blvd/SR 84 East	98300	6	5040/NB 3675/SB	3040/NB 6665/SB	A/NB D/SB	.45/NB .88/SB
Sheridan Rd/Vargas Rd	NA	6	NA	NA	NA	NA
<b>Vasco Road</b>						
I-580/N.Canyons Pkwy (Dalton)	43900	6	1835/NB 1598/SB	1113/NB 2836/SB	A/NB E/SB	.35/NB .93/SB
N.Canyon Pkwy/C.C.County Line	47200	4	2970/NB 1231/SB	700/NB 3475/SB	A/NB F/SB	.34/NB 1.67/SB
<b>Proposed North Canyons Parkway</b>						
Hacienda/Tassajara Rd	38900	6	597/WB 4095/EB	3513/WB 146/EB	F/WB A/EB	1.28/WB .06/EB
Tassajara Rd/Collier Canyon Rd	9300	6	597/WB 1143/EB	602/WB 630/EB	A/WB A/EB	.25/WB .26/EB

TABLE C-8 (Continued)

## 2010 Roadway Operating Conditions

Collier C. Rd/N.Livermore Rd	17100	6	90/WB 2872/EB	2561/WB 57/EB	F/WB A/EB	1.0/WB .02/EB
N.Livermore Rd/Vasco Rd	17700	6	206/WB 2668/EB	2448/WB 51/EB	E/WB A/EB	.95/WB .02/EB
Las Positas Extension (Proposed)						
Murrieta/Isabel Exp.	16700	4	344/WB 1450/EB	1516/WB 119/EB	F/WB A/EB	1.29/WB .10/EB
Isabel Exp./El Charro Rd	5900	6	51/WB 902/EB	842/WB 37/EB	A/WB A/EB	.50/WB .02/EB
El Charro Rd/Tassajara Rd	5600	6	34/WB 979/EB	1009/WB 12/EB	A/WB A/EB	.41/WB .0/EB

**Source:** CMA preliminary data to be used for the Alameda County Transportation Plan.

<sup>1</sup> Baseline Env. Consulting, FEIR: San Joaquin County Comprehensive Planning Program, May, 1992.

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

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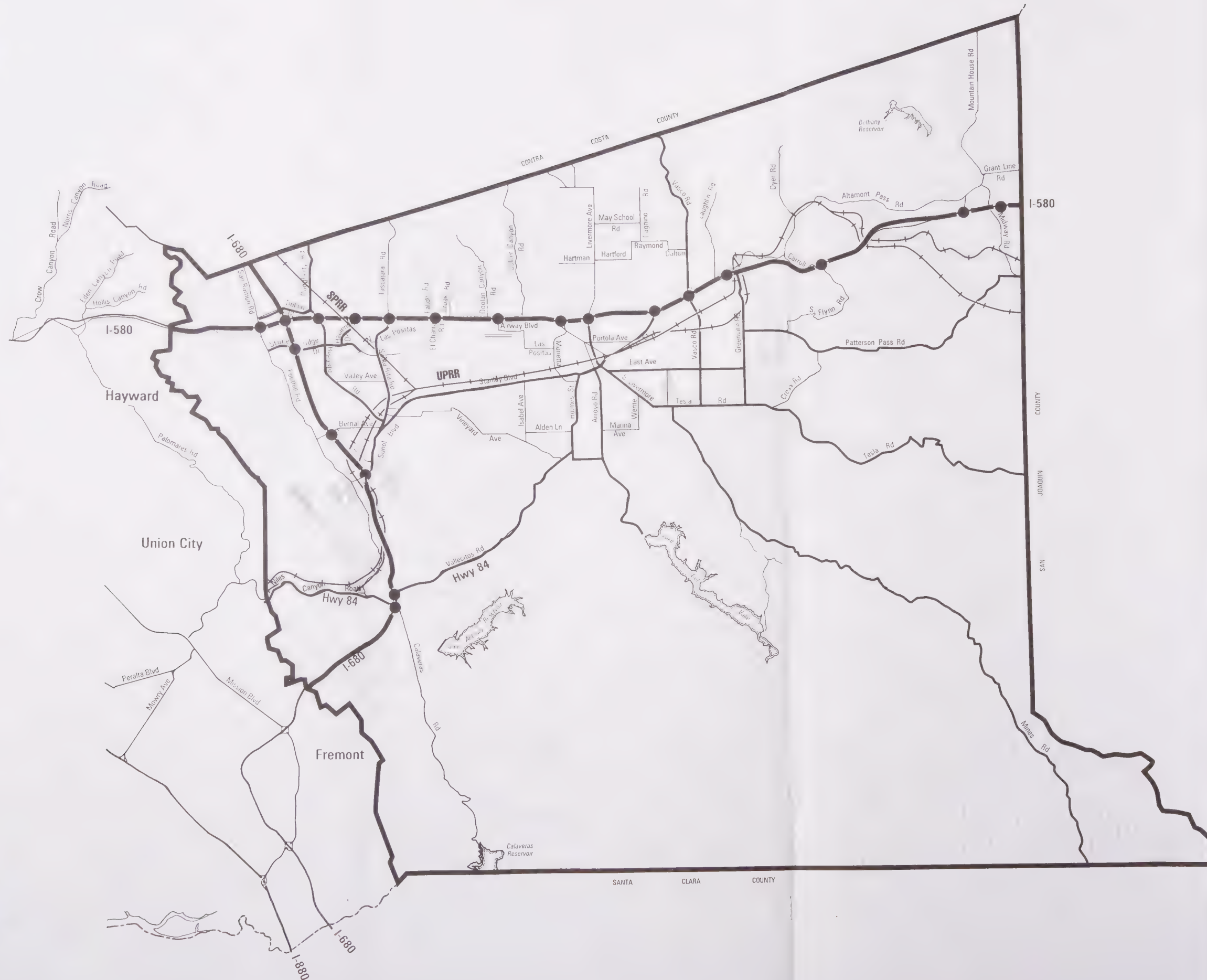




# Highways and Major Arterials

## LEGEND

-  Freeway
-  Freeway Interchange
-  Arterial
-  Railway Lines  
SPRR = Southern Pacific Railroad  
UPRR = Union Pacific Railroad



SOURCE: Alameda County Planning Department

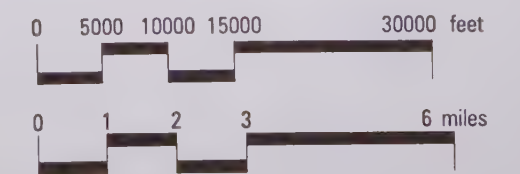


FIG. 11





# Congestion Management Program

## LEGEND

 Designated Roadway Network

Hayward  
(portion)

Dublin

Pleasanton

Livermore

SOURCE: Alameda County Congestion Management Agency,  
Oct. 1991

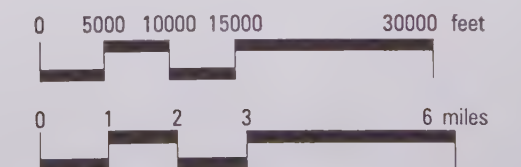


FIG. 12











# Bikeways: Within City Limits

## LEGEND

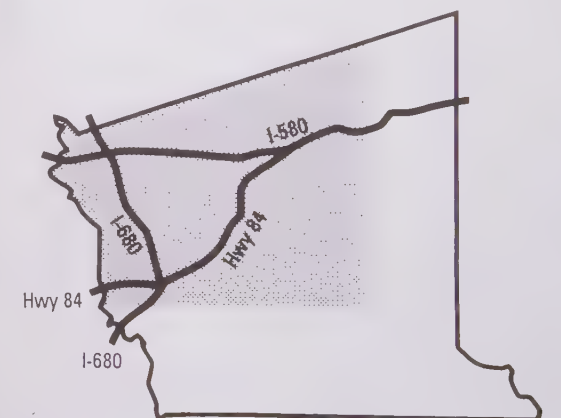
-  Existing Class I
-  Proposed Class I
-  Existing Class II & III
-  Proposed Class II & III

NOTE: Bikeways are defined by Caltrans as follows:

Class I (Bike Path) - Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with cross-flow minimized.

Class II (Bike Lane) - Provides a striped lane for one-way bike travel on a street or highway.

Class III (Bike Route) - Provides for shared use with pedestrian or motor vehicle traffic.



SOURCE: Pleasanton GIS Division, Feb. 1992



FIG. 13










# Bikeways: Outside City Limits

## LEGEND

-  Existing Class I
-  Existing Class II & III
-  Proposed Class II & III

NOTE: Bikeways are defined by Caltrans as follows:

Class I (Bike Path) - Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with cross-flow minimized.

Class II (Bike Lane) - Provides a striped lane for one-way bike travel on a street or highway.

Class III (Bike Route) - Provides for shared use with pedestrian or motor vehicle traffic.



SOURCE: Pleasanton GIS Division, Feb. 1992

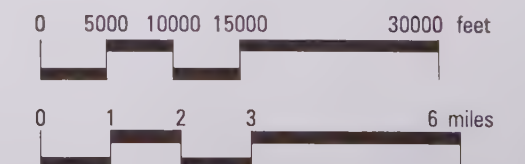


FIG. 14



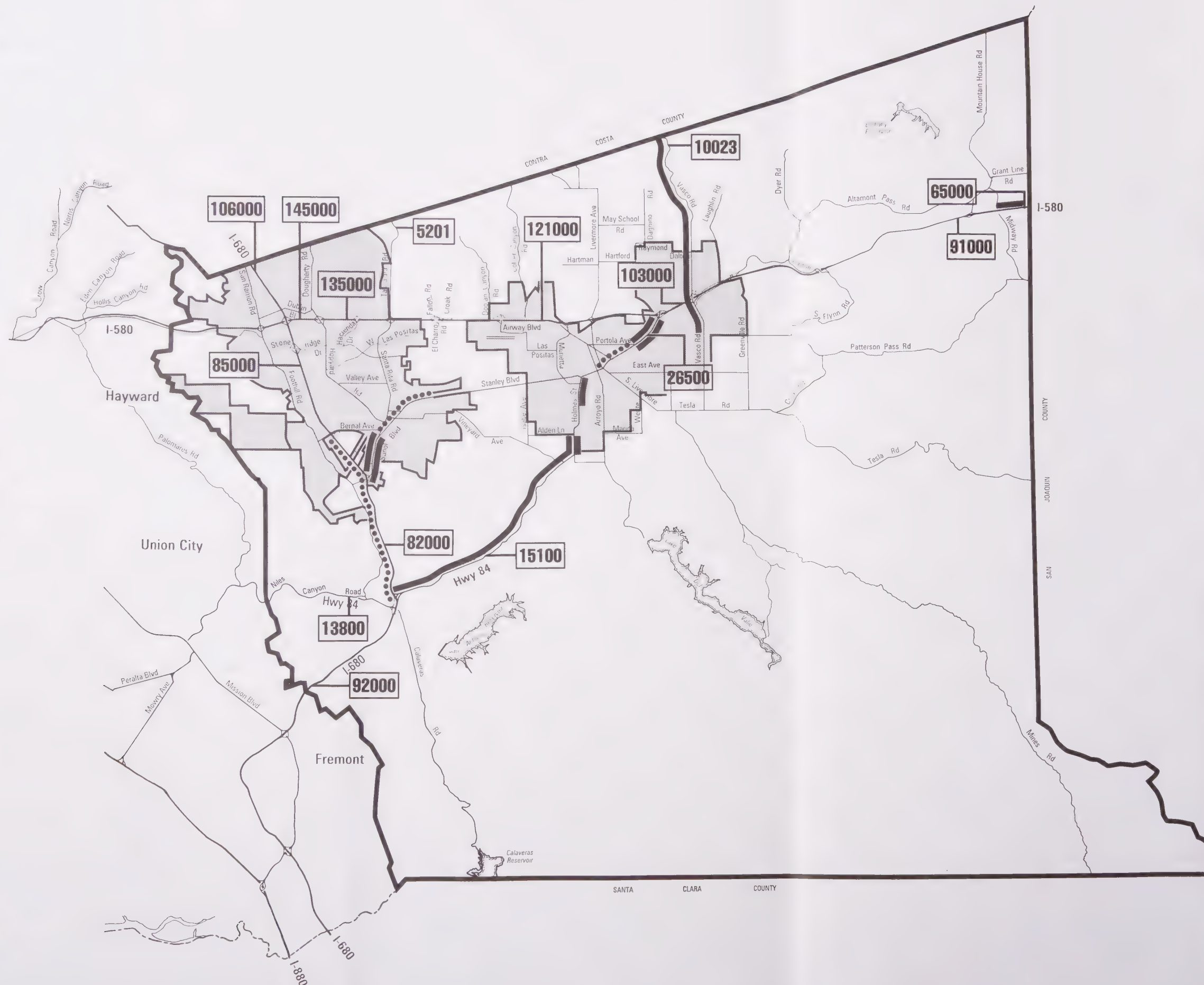


# Daily Traffic Volumes & Levels of Service, 1990

## LEGEND

- ..... Level of Service D (tolerable delay at A.M. Peak Period)
- Level of Service E or F (intolerable delay at A.M. Peak Period)
- 13800 Average Daily Traffic Volume

**NOTE:** Levels of Service A, B and C are not shown on this map. Levels of Service depicted are for the A.M. peak period only, and the direction to which the LOS applies is indicated by the placement of the LOS notation (to the right or left of the roadway).



SOURCE: Alameda County Congestion Management Agency, Oct. 1991

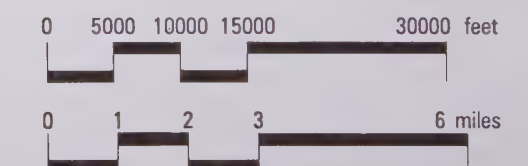


FIG. 15





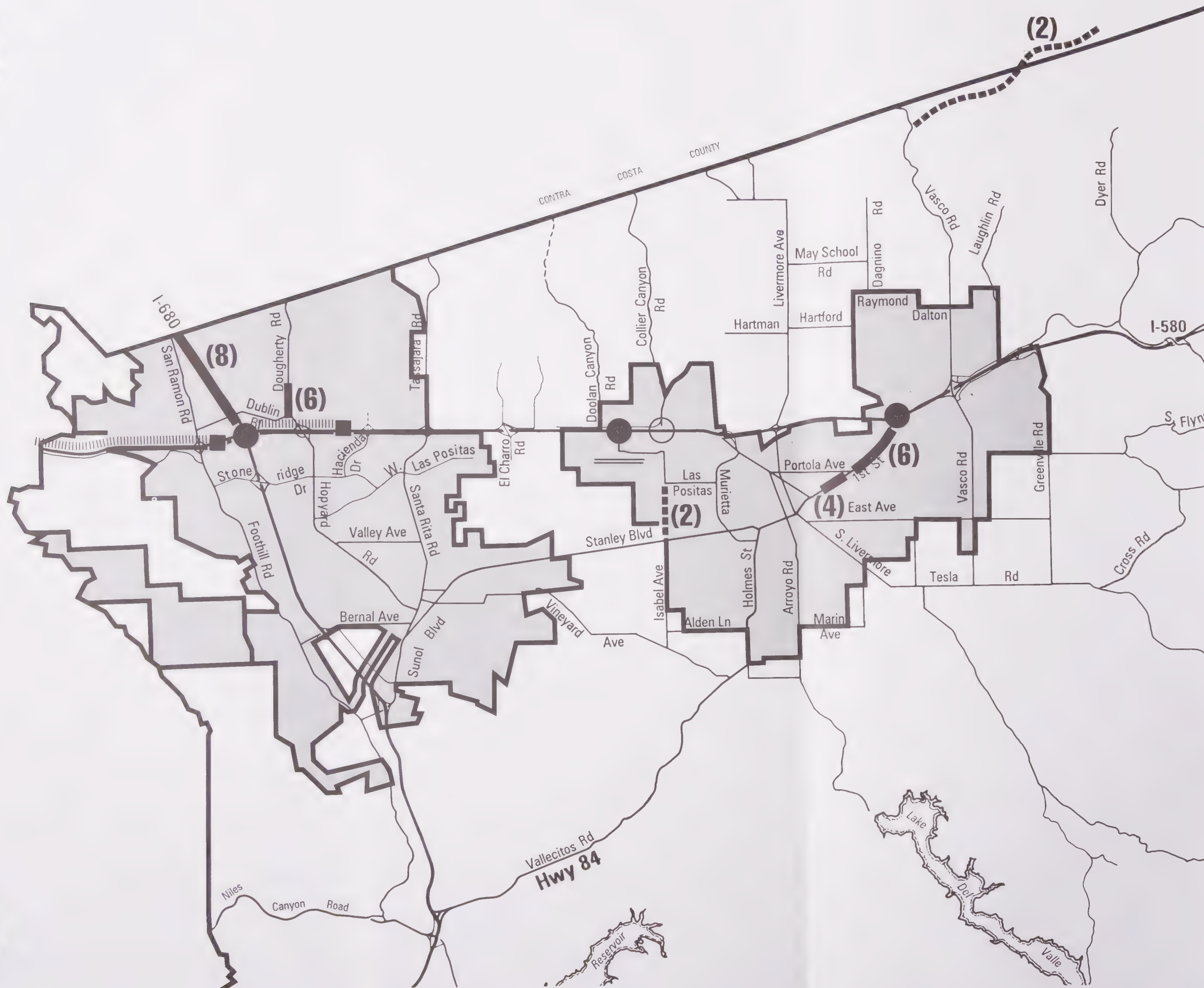


# Programmed Transportation Improvements

## LEGEND

- Interchange Improvements
- New Interchange
- ▬ Roadway Widening
- ▬ New Roadway
- ▬ BART Extension
- BART Station
- (6) Future Number of Lanes

NOTE: Programmed improvements are those listed on state and regional transportation improvement plans and which have funds committed. Widening of I-580 between Midway Road and County Line is not shown.



SOURCE: "TIP: FY 1992-96", MTC, 1991  
"STIP", CTC, 1992

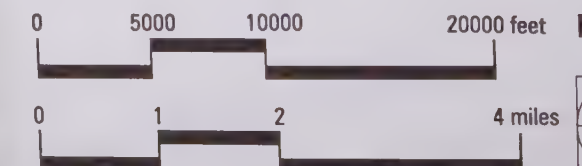








FIG. 16



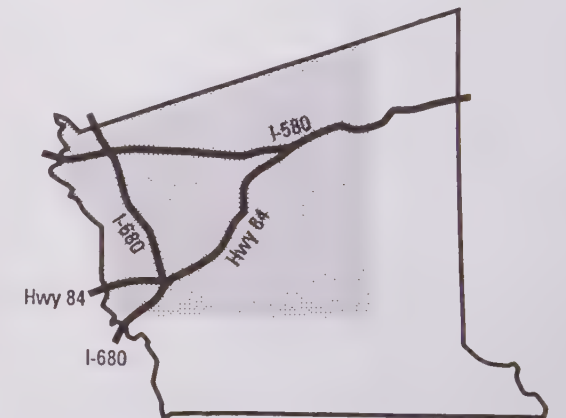


# Proposed Transportation Improvements

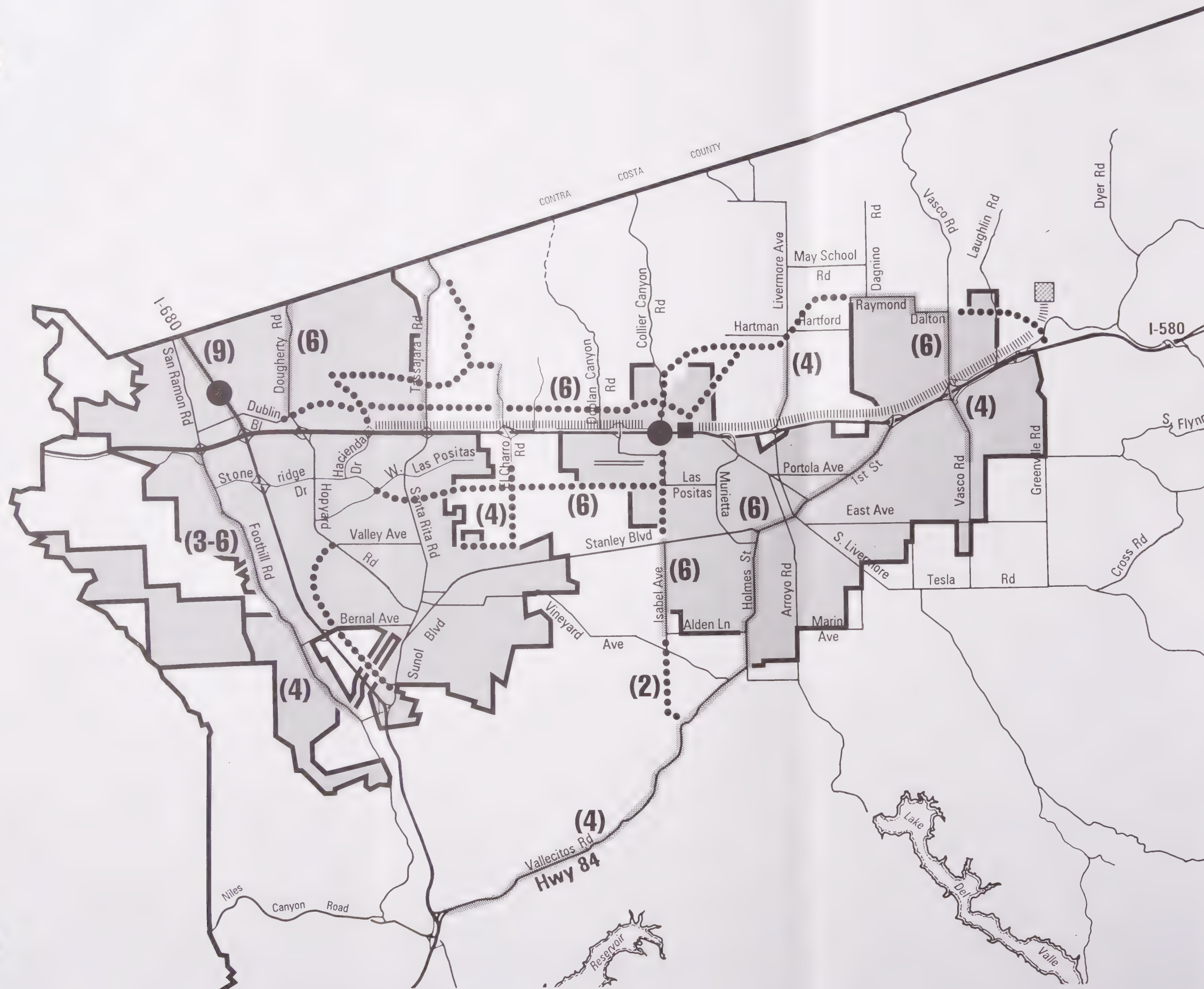
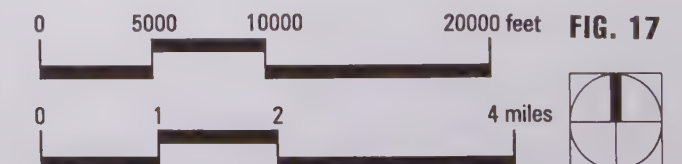
## LEGEND

-  Proposed Arterial Improvements
-  Proposed Roadway Segments
-  Proposed Interchange
-  BART Extension
-  BART Yard
-  BART Station
- (4)** Future Number of Lanes

**NOTE:** Improvements shown are those included in adopted city, county, and regional plans as listed below. Where plans conflict, those improvements within city plans are shown.



**SOURCE:** Dublin General Plan, 1985  
 Eastern Dublin General Plan Amendment, 1992  
 The Pleasanton Plan, 1986  
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 Regional Transportation Plan, 1991  
 Preliminary Data for Alameda Countywide Transportation Plan, 1992



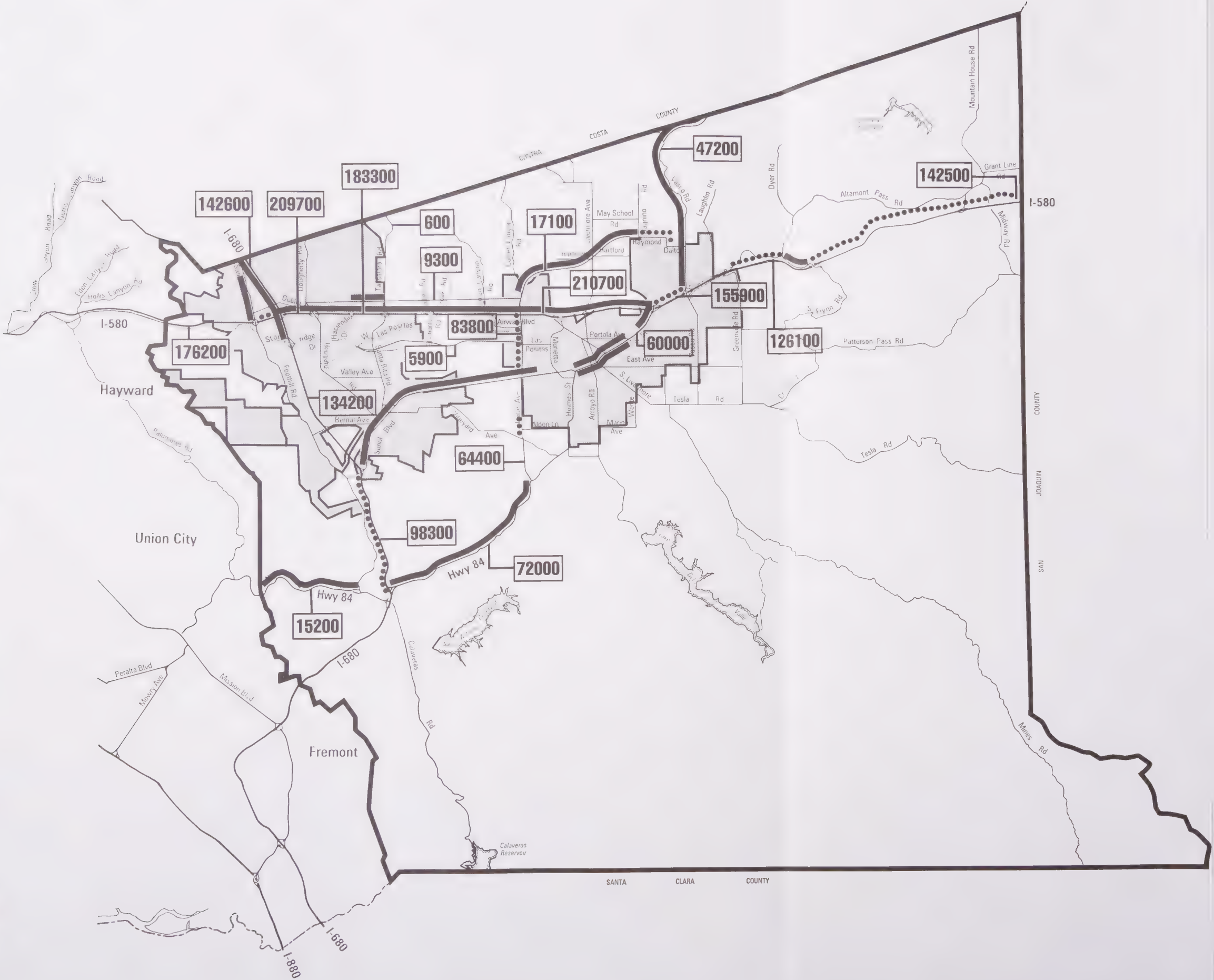


# Daily Traffic Volumes & Levels of Service, 2010

## LEGEND

- ..... Level of Service D (tolerable delay at A.M. Peak Period)
- Level of Service E or F (intolerable delay at A.M. Peak Period)
- 85000 Average Daily Traffic Volume

NOTE: Levels of Service A, B and C are not shown on this map. Levels of Service depicted are for the A.M. peak period only, and the direction to which the LOS applies is indicated by the placement of the LOS notation (to the right or left of the roadway).



SOURCE: Alameda County Congestion Management Agency, Oct. 1991

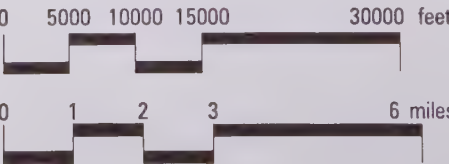


FIG. 18







## Section D. Public Facilities and Services





## **Water Supply**

### **■ INTRODUCTION**

Water has become an increasing focus of interest in the East County as demand continues to climb in the face of limited existing supply. This report describes how water is managed and distributed in the East County, where the water comes from and how it is used, and what the existing water supply and demand equation looks like in terms of planned and proposed growth.

### **■ EXISTING CONDITIONS**

#### **Water Management**

Zone 7 of the Alameda County Flood Control and Water Conservation District is the water management agency for the Livermore-Amador Valley water basin, a 425 square mile service area possessing the same geographical boundaries as the East County planning area, except along the western edge where some discrepancies occur (see Figure 19). Zone 7 is one of ten active service zones of the District. The District itself was established by State legislation in October 1949, to solve problems of flooding, drainage, channel erosion, and water supply and conservation in Alameda County. Subsequently, Zone 7 was established by popular vote of its residents in 1957 under an amendment to the District Act. Zone 7 is the only zone within the District governed by its own seven-member Board of Directors elected at large; the remainder of the District is directly governed by the Alameda County Board of Supervisors. (In 1978, the Board of Supervisors and the Zone 7 Board entered into a Memorandum of Understanding clarifying the relationship between the two entities. The conditions of this memorandum identify a joint authority between the Board of Supervisors and the Zone 7 Board whereby only major actions require the concurrence of both boards.)

Zone 7 is responsible for: bulk water purchase and treatment; distribution of treated drinking water and untreated agricultural irrigation water; surface water and groundwater basin management; and flood control. The East County's four water retailers are the City of Pleasanton, Dublin San Ramon Services District, California Water Service Company, and City of Livermore. Components of the water system for the Livermore-Amador Valley service area, including service boundaries for water retailers, are shown on Figure 19.

## Existing Water Supply

[Water supply information in this report utilizes *Zone 7, Water Supply Update*, February 1992 as a primary source. Other sources are indicated in the text.]

Zone 7 water is derived from three sources: (1) imported water from the Sacramento-San Joaquin Delta via the South Bay Aqueduct, a part of the State Water Project; (2) locally conserved runoff that flows into the Del Valle Reservoir; and, (3) local groundwater. Table D-1 below summarizes existing water supply by source for the Zone 7 service area.

TABLE D-1	
Existing Water Supply by Source for the Zone 7 Service Area	
Source	Existing Water Supply (in Acre-Feet)
State Water Project	31,700 (Average Annual Yield)
Del Valle Reservoir Storage	7,000
Safe Groundwater Yield	13,200
<b>Total:</b>	<b>51,900</b>
<b>Source:</b> Alameda County Planning Department based on information contained in Zone 7, <u>Water Supply Update</u> , February 1992.	

State Water Project. Imported water from the State Water Project (SWP) currently supplies about 60 percent of the water used in the Zone 7 service area. Under a long-term contract with the California Department of Water Resources (DWR), Zone 7 receives water from the Sacramento-San Joaquin Delta where SWP pumping facilities near Tracy withdraw and transport water to the Livermore-Amador Valley via the South Bay Aqueduct (SBA). The imported surface water is generally of good quality. SWP water intended for municipal use is treated by Zone 7 at either the Del Valle Water Treatment Plant or the Patterson Pass Treatment Plant and then distributed to the local water retailers via underground pipelines.

As shown in Table D-2, Zone 7's contracted amount of SWP water was 32,000 acre-feet<sup>1</sup> in 1990 and increases each year until a maximum annual entitlement of 46,000 acre-feet is reached in 1997, an amount slightly more than one percent of the total maximum annual SWP entitlements of 4.2 million acre-feet. The actual amount of water received by a contractor in any one year, however, is dependent upon the amount of requested deliveries from SWP contractors and the amount of water made available to the SWP system from rainfall and snowpack runoff. If cutbacks to contractors are required due to less-than-maximum yield to the SWP system, contracted amounts are reduced commensurate with the percent of shortfall.

Zone 7's maximum entitlement of 46,000 acre-feet in 1997 is also predicated on the completion of planned additions to the SWP system. With *existing* facilities, the SWP can yield an average of only 2.89 million acre-feet per year, or 69 percent of the maximum SWP supply capability, and Zone 7 can expect to receive an average yield of only 31,700 acre-feet (69 percent of 46,000 acre-feet) from the SWP. If all the planned SWP facilities are completed and put into operation, the average annual yield which Zone 7 can expect to receive will increase to 40,100 acre-feet (see discussion below under **Potential Future Water Supplies**). The average yield figures are based on the historic climatic conditions from 1922 to 1978.<sup>2</sup> For this 57-year period, the amount of surplus water above the yield of 31,700 acre-feet equals the amount of deficit below this average yield.<sup>3</sup> For water deficit years, Zone 7 and its major purveyors "borrow" from the basin by maintaining groundwater pumping capacity to meet 75 percent of the maximum daily demand; during water surplus years, the groundwater table is recharged.

Locally Conserved Runoff. Under its water rights permit for the Arroyo del Valle and under an operating agreement with the Department of Water Resources, Zone 7 captures and stores an average of approximately 7,000 acre-feet<sup>4</sup> of local surface runoff in the Del Valle Reservoir. Zone 7's right to store water in Del Valle Reservoir may be revoked at any time.

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<sup>1</sup> One acre-foot is an acre of water one foot deep and is equivalent to approximately 326,000 gallons.

<sup>2</sup> See Kennedy/Jenks (April 1992) for a more current assessment of SWP average yield figures. Using recent DWR data for climatic conditions from 1922 to 1991, the report places the average yield (with existing facilities) to be 81 percent of Zone 7's entitlement rather than the 69 percent given in Table WS-2 above. This represents an average increase in supply of 5,560 acre-feet over the 31,700 acre-feet identified in this background report.

<sup>3</sup> Statistically, Zone 7 would receive less than 31,700 acre-feet from the SWP 44 percent of the time and more than 31,700 acre-feet 56 percent of the time.

<sup>4</sup> The annual amount of water which Zone 7 has developed is based on the level of precipitation in the local watershed. This long-term average yield is based on records from 1969 to 1990.



TABLE D-2

**Water Supply Capability: State Water Project/ Zone 7**

Supply Conditions	SWP Delivery	Zone 7	
		Entitlement	% of Maximum Entitlement
<b>Maximum Annual Entitlement w/Existing and Planned SWP Facilities</b>	4.2 Million	Up to Contracted Amount: 32,000/(1990) to 46,000/(1997)	N.A.
<b>Average Annual Yield w/Planned SWP Facilities</b>	3.66 Million	40,100	87%
<b>Average Annual Yield w/Existing SWP Facilities</b>	2.89 Million	31,700*	69%

\* The 31,700 acre-feet figure may be conservative for the short-term because it does not take into account that current requested SWP deliveries are only 3.4 million acre-feet per year and are not expected to reach the full delivery of 4.2 million acre-feet until 2010. In this interim period, Zone 7 could reasonably expect to receive a larger percent of their entitlement from the pool of water not currently being requested by water contractors of the SWP system. See also footnote 2.

**Source:** Alameda County Planning Department based on information contained in Zone 7, Water Supply Update, February 1992.

**Local Groundwater.** The Livermore-Amador Valley is underlain by a central underground basin reservoir which yields groundwater from two relatively distinct water bearing formations: an unconfined upper alluvial aquifer over a sequence of deeper semi-confined aquifers called the Livermore formation (see the *Hydrology and Water Quality* background report in Section E). Based on hydrologic records that have been maintained since 1974, Zone 7 has determined that the long-term safe yield<sup>5</sup> for the groundwater basin is 13,200 acre-feet annually. The major water retailers are permitted to pump up to 7,200 acre-feet annually with the balance of the safe yield (6,000 acre-feet) being pumped by agricultural and gravel mining interests (see **Existing Water Use and Water Allocation** below). In addition to the allotted use of long-term safe

<sup>5</sup> Safe groundwater yield is defined as the amount of water that can annually be pumped from the groundwater basin that will be replaced by average annual natural recharge by percolation of rainfall and applied water, stream recharge, and subsurface inflow (Zone 7, Groundwater Basin Safe Yield, January 17, 1990).

yield, Zone 7 relies on the available groundwater for operational backup of imported water, emergency reserve, and to meet peak demand during summer months.

Historically, the groundwater basin has been overdrafted. Until the early 1960s, Livermore-Amador Valley residents relied on groundwater as their sole source of supply. One key reason for the establishment of Zone 7 in 1957 was the serious overdraft problem and resultant declining water table elevations. To redress historic overdraft and to keep within the limits of long-term safe yield, Zone 7 has been artificially recharging the basin up to a rate of 13,000 acre-feet per year using: 1) releases of State Water Project water from the South Bay Aqueduct into the arroyos during off-peak months, and 2) releases from Del Valle Reservoir of the Zone's permitted local surface runoff from the Arroyo Del Valle watershed.

Zone 7 uses the Fairgrounds Well (located in Pleasanton) groundwater elevation as a basis for overall basin operations. Under natural recharge conditions in wet years, the Fairgrounds Well has a maximum groundwater elevation of 330 feet with a storage capacity of about 280,000 acre-feet. However, due to the loss of groundwater from the basin at elevations higher than 290 feet<sup>6</sup>, Zone 7 maintains the groundwater elevation at 280 feet, a level that provides a managed regulatory storage capacity of 240,000 acre-feet. Maintaining groundwater levels at the 280-foot elevation also facilitates the economic extraction of gravel in the quarry area between Pleasanton and Livermore by reducing the amount of water which would have to be pumped from the active pits. Due to higher than average groundwater usage during the past few years of drought, the present groundwater level has dropped to the 250-foot elevation, representing storage of 200,000 acre-feet. Zone 7 estimates that at least half the 200,000 acre-feet could readily be pumped and recharged if additional surface supplies were secured (Zone 7, 1992).

### **Existing Water Use and Water Allocation**

There are five principal types of water users in the Livermore-Amador Valley: municipal and industrial; small systems and institutions; rural residential; gravel mining operations; and irrigated agriculture. Existing water demand by user type is discussed below and summarized on Table D-3 as is allocation of the existing water supply to these users. Zone 7's water allocation to each user reflects existing contracts and groundwater management policy.

**Municipal and Industrial.** Zone 7 sells treated water from SWP and local surface runoff sources to the East County's four water retailers: City of Pleasanton, Dublin San Ramon Services District, California Water Service Company, and City of Livermore. The contracts between Zone 7 and the water retailers provide that the retailer can obtain as much water as it needs from Zone 7 within the limits of the available supply. Annually, the retailer must provide a five year

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<sup>6</sup> Between the 330 and 290 foot elevations, subsurface groundwater spills into the Arroyo de la Laguna and then into Alameda Creek, at which point it flows out of the basin.



demand forecast to Zone 7. In addition to purchasing water from Zone 7, the four major retailers are permitted by contract with Zone 7 to pump an independent quota of groundwater as a supplemental source. Under current policy, Zone 7 supplies are available to its contract holders on a first-come first-serve basis. Therefore, the timing of demand for new connections will have a bearing on Zone 7's ability to meet that demand.

In 1991, the water retailers supplied a service area population of roughly 133,000. According to Zone 7 (February 1992), the Zone assumes for planning purposes an overall community consumption rate of 210 gallons per capita per day (or 0.235 acre-feet per capita per year). (Historically, the Zone used 160 to 180 gallons per day per capita until large scale commercial and industrial development came to the Livermore-Amador Valley in the early 1980s. Industrial use may be estimated at 50 gallons per capita per day.)

The City of Pleasanton, the City of Livermore, and the Dublin San Ramon Services District are public agencies and are therefore subject to Local Agency Formation Commission (LAFCO) procedures to expand their service boundaries. The California Water Service Company is a privately-owned company regulated by the Public Utilities Commission (PUC). Service expansion under PUC regulations requires that all interested parties be notified, and in some cases a public hearing be held, prior to the Commission's decision. Although service area expansion of private utility companies does not go through LAFCO, the PUC normally bases its approval contingent on LAFCO's position on the expansion application.

Small Systems and Institutions. Zone 7 has reserved 5,000 acre-feet of treated water from the SWP system and local surface runoff for small systems and institutions (located in unincorporated areas and therefore not served by municipal water retailers) and agriculture. Institutions (Veterans Administration Medical Center, Santa Rita, and Camp Parks) are currently receiving 1,100 acre-feet while small systems (Oakland Scavenger and Springtown Golf Course) receive 400 acre-feet. The remaining 3,500 acre-feet is therefore available for use by agriculture (see below).

Rural Residential. Residents that are not located within water retailer service areas use wells for their water supply. In its groundwater management policy document (Zone 7, August 1987), the Zone states that under California law landowners are entitled to withdraw groundwater for a "beneficial use" on their own property. Zone 7 could impose, but currently does not require, pumping permits; therefore, groundwater consumption is not monitored. The use of groundwater for residential use is somewhat constrained by the relatively high concentrations of total dissolved solids, particularly chloride, boron, and, in some locations, nitrate salts. Generally, groundwater must be softened for domestic use. Groundwater drawn from deeper wells is usually of better quality than shallow groundwater (Livingston, June 1988). Refer to the *Hydrology and Groundwater Quality* background report in Section E, for more information.



TABLE D-3

**Zone 7 Allocation and Existing Water Use  
in the Livermore-Amador Valley**

User	Allocation/Water Use by Source <sup>1</sup> (In Acre-Feet)		
	Groundwater	Surface Water (State Water Project and Del Valle Reservoir)	Totals
Municipal and Industrial (M&I)	7,200 af	33,700 af	40,900 af
	7,200 af	25,500 af	32,700 af
Small Systems and Institutional	0	1,500 af <sup>2</sup>	1,500 af
	0	1,500 af	1,500 af
Rural Residential	Unknown	0	Unknown <sup>5</sup>
Gravel Mining	3,000 af		3,000 af
	3,000 af	0	3,000 af
Irrigated Agriculture	3,000 af	3,500 af <sup>2</sup>	6,500 af
	900 af <sup>3</sup>	2,400 af <sup>4</sup>	3,300 af
Totals:	13,200 af	38,700 af	51,900 af
	11,100 af	29,400 af	40,500 af

**Note:**

<sup>1</sup>Water allocation is indicated by the top figure; existing water use is indicated by the bottom figure.

<sup>2</sup>Zone 7 has allocated a total of 5,000 acre-feet to small systems and agriculture. The split of 1,500 acre-feet to small systems and 3,500 acre-feet to agriculture assumes that future use by small systems will not exceed existing use and that agriculture will absorb the remaining allocation.

<sup>3</sup>Estimated agriculture pumping in 1991 (*Zone 7, Water Resources Monitoring Groundwater Supply and Utilization*, December 1991).

<sup>4</sup>Scheduled delivery of untreated water from the South Bay Aqueduct in 1991 (*Zone 7, Untreated Water Delivery Summary*, December 1991).

<sup>5</sup>Rural residential groundwater use is not known because the wells are not monitored.

**Source:**

Alameda County Planning Department

Gravel Mining. The Livermore-Amador Valley Quarry Area is located south of I-580 between the cities of Pleasanton and Livermore. Water consumptive uses by the sand and gravel operations include: moisture contained in the sands and gravels that are sold; groundwater pumped from the gravel pits to facilitate the extraction process which is discharged to surface streams and leaves the basin; and evaporation losses from recycled water used to wash the gravel. Although past groundwater use has been relatively high due to dewatering activities<sup>7</sup>, Zone 7 estimates that usage will level out at about 3,000 acre-feet now that the water table has been lowered to the 280 foot elevation (Vincent Wong, Zone 7, April 9, 1992).

Irrigated Agriculture. There are an estimated 2,250 acres of irrigated agriculture in the Livermore-Amador Valley, 2,100 acres of which are located in the South Livermore Valley, with most of the remaining irrigated acres located between Pleasanton and Livermore south of I-580. Agricultural users in the South Livermore Valley utilize untreated water which is either imported via the SWP system or pumped from wells. In general, crop requirements for water are heavily dependent on the water retention properties of the soils. In the South Livermore Valley, vineyards require about 1 to 1.5 acre-feet of applied water per acre per year (this includes water applied by sprinklers for frost protection); olive orchards require somewhat less than this amount while apples and pears require somewhat more than this amount. Drip irrigation can reduce water use in the South Livermore Valley by about 10 percent (Phil Went, Went Bros. Estate Winery, personal communication, April 24, 1992). Existing agricultural demand in the Livermore-Amador Valley is about 3,300 acre-feet, 2,400 acre-feet of which is untreated water from the South Bay Aqueduct with the remaining 900 acre-feet from groundwater (South Livermore Valley Area Plan DEIR, June 1992). Zone 7 has adopted an agricultural water policy (February 21, 1990) that recognizes the long-term importance of agriculture and viticulture to residents of East County. To this end, the policy calls for Zone 7 to distribute cutbacks proportionately among all users during times of drought and to accommodate peaking demands of all its customers to the extent possible.

Groundwater. Pumping permits and pump taxes are not currently being imposed by Zone 7, although their imposition is the legal prerogative of the Zone. Use is estimated by Zone 7 based on acres under cultivation. Use of groundwater in the South Livermore Valley is particularly important during peak demand when sufficient imported water is unavailable. For its groundwater budget, Zone 7 allocates a total of 6,000 acre-feet annually to gravel mining and agricultural use. With foreseeable annual gravel mining needs estimated by Zone 7 at about 3,000 acre-feet, the remaining 3,000 acre-feet is available for agriculture. Use of groundwater for agricultural purposes, especially grapes, is constrained by the high concentrations of boron in certain areas of the South

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<sup>7</sup> About 4,800 acre-feet of groundwater were used by the three gravel mining operators during the 1989 water year while average mining use between the years 1974 and 1989 was 6,100 acre-feet. (Zone 7, Memorandum, Hydrologic Inventory: 1989 Water Year, Dennis Maslonkowski, Water Resources Engineer, January 3, 1990)



Livermore Valley (see the *Hydrology and Water Quality* background report in Section E, for more information).

**Untreated Imported Water.** As noted previously, Zone 7 reserves a total of 5,000 acre-feet (treated and untreated water) for small systems and institutional users and for agriculture. At current small system/institutional usage (1,500 acre-feet), about 3,500 acre-feet of untreated imported water is available for agriculture. Agricultural use of untreated imported water was about 2,400 acre-feet in 1991 and will increase to about 3,000 acre-feet in 1992 (Zone 7, *Untreated Water Delivery Summary*, February 1992). Zone 7 does not have a delivery system for the untreated imported water which it sells to agricultural users; users are generally located adjacent or near to the South Bay Aqueduct and draw water via turnout facilities paid for by the user. Users of SWP water at some distance from the SBA have made arrangements for delivery with intervening landowners. (Livingston, June 1988)

**Peak Demand Availability of Imported Water.** A critical water supply question for irrigated agriculture is one of peak demand and the expected reduction in available untreated SBA peak flow during periods when heavy irrigation is needed. By contract, Zone 7 may use 11 percent of its maximum annual entitlement in the peak months. The flow rate available to Zone 7 from the SBA on the basis of that limit is 169 acre-feet per day. Peak usage in 1988 was 89 acre-feet per day of treated water and 80 acre-feet of untreated water, an amount which easily satisfied the agricultural demand for 55 acre-feet for untreated water. However, projected supplies of untreated water for peak demand agricultural use are dropping each year due to rising needs of treated water for municipal and industrial use. Projected supplies of untreated water for agriculture are expected to drop to a low of about 25 acre-feet per day peak demand use by 1995 and are projected to remain at that level through the year 2010. (Zone 7, *Engineer's Report*, 1987) In the absence of new transport facilities to bring water into the South Livermore Valley or storage reservoirs to set aside supplies for the summer months, this gap will become a serious impediment to agricultural activities as currently practiced. (Livingston, *Technical Memorandum No. 1*, June 1988) Zone 7 has notified current agricultural users of imported water that coordination of irrigation activities among users to prevent simultaneous water turnout could help reduce this peak-demand problem.

**Water Costs.** Drilling a 500 to 700 gallon per minute well to a depth of 200 to 300 feet would cost between \$7,500 and \$10,000 and the pump and related equipment would cost between \$10,000 and \$15,000 (Livingston, June 1988, p. IV-9). Costs of this magnitude when averaged over the multi-year useful life of the facilities would not add significantly to the overall cost of an agricultural operation. The energy and maintenance cost of a pumping operation of this size would add about \$20 to the cost of an acre-foot of



groundwater. The above cost estimate was calculated in 1988; therefore, equivalent 1992 costs may be higher.

The cost of Zone 7 untreated water for agricultural irrigation is based on the equivalent cost of water at the Delta source plus the energy cost to pump it and an administrative charge added by the Zone. The Zone's Board of Directors sets the charge annually. Untreated water costs have ranged from about \$30 per acre-foot (1988) to a high of \$39 per acre-foot (1984 and 1985) for a rough average (between 1983 and 1988) of \$35 per acre-foot. (For 1993, Zone 7 will charge \$55 per acre-foot for untreated water.) Annual cost fluctuations have generally reflected current energy rates. The cost of \$35 per acre-foot for untreated irrigation water is (to at least one grower) a relatively small part of the overall operating cost of grape growing (Livingston, pp. IV-8 and -9). The grower estimated the total per-acre operating cost to range from \$1,500 to \$2,000, leading to the conclusion that the approximately one acre-foot of imported water which he applied annually to one acre of grapes would represent about two percent of the total variable costs. This grower agreed with others that wine grape production could easily endure higher irrigation water costs before the feasibility of continued operations would be affected. If water had to be purchased through water marketing, however, costs could increase significantly. In addition to paying the Zone for water, individual irrigators must construct facilities to convey the water from the turnout at the SBA to the field to be irrigated. In 1988, the approximate added cost of "boosting" the water to its destination is about \$30 per acre-foot, leading to a total water cost of roughly \$65 per acre-foot for some parcels.

## Sub-Areas

### South Livermore Valley

- Environmental review of the County's proposed South Livermore Valley Area Plan (SLVAP) identified the following water-related impacts arising from implementation of SLVAP policies:
- Water demand from new agricultural acreage could exceed existing water supply allocated for agricultural use by about 2,500 acre-feet.
- Water supply of imported water during periods of peak demand may not be adequate for the needs of irrigated agriculture.
- Pumping of groundwater by agricultural, rural residential and other rural uses could result in the long-term depletion of the groundwater basin.

- Groundwater may not be available for rural residential, bed-and-breakfast and winery uses in all locations due to hydrological conditions.
- New urbanized development would create the need for extension of the water distribution system.
- Water demand from new urban development could exceed existing water supply depending on the timing of development.

Pertinent proposed SLVAP policies and DEIR mitigations are as follows:

- Development depends upon demonstration, to the satisfaction of the County and Zone 7, that adequate water supplies are available for domestic, commercial, and irrigation needs.
- The development of additional sources of irrigation water for vineyards and other cultivated agriculture by investigating wastewater reclamation and development of other supply and delivery systems is encouraged.
- Zone 7 should consider developing a groundwater pump monitoring and cost allocation system to cover the cost of new water in the event that additional supplies are needed and can be secured and stored in the groundwater basin.
- In an effort to conserve water, water retailers are encouraged to require proponents of development projects to implement an off-set program utilizing one or more of the water conserving best management practices shown on Table D-5.

Refer to the SLVAP DEIR (June 1992) for a detailed analysis.

Doolan Canyon, East Dublin, North Livermore Valley. The undeveloped area north of I-580 and east of Tassajara Road is not located within any of the valley's four water service districts. Although residents of the area are currently drawing water from individual wells, the insufficiency of groundwater for development of any size would require the installation of a complete water distribution system connecting to the Zone 7 system. In addition to water distribution pipes, pumps and water storage facilities would be needed to serve development in higher elevation areas at the 40 pounds per square inch (psi) flow standard. The cost of developing a new water distribution system is high. The Dublin San Ramon Service District is proposing a water distribution system for East Dublin Specific Plan area which would provide three pressure zones, the highest zone being capable of delivering water up to the 740-foot elevation. The City of Livermore Water Department will have the pressure capability to serve



domestic and fire flow needs up to the 520-foot elevation in the Triad and Doolan and Collier Canyon areas with construction of a planned water storage tank at the 615-foot elevation, while the California Water Service Company can currently serve domestic and fire flow needs up to the 640-foot elevation from a storage tank at the 740-foot elevation. The undeveloped area north of I-580 could also be served by the California Water Service Company. In general, the higher the elevation (above the provider system) of land to be served by a water distribution system, the more costly the system in terms of installation and energy; and, the steeper the land, the less efficient a distribution system would be because land use intensity is usually reduced in response to environmental conditions.

West Dublin. Most of the Western Dublin general plan amendment planning area is served by private wells and is located with Zone 2 of Alameda County Flood Control and Water Conservation District. For development to proceed, the general plan amendment area requires annexation to the Dublin San Ramon Service District which presently receives water from Zone 7. Approval by the Zone 7 Board of Directors would be required before Zone 7 water could be purveyed in this area. (At this time, Zone 7 has not committed itself to expansion of its service area.) The current DSRSD water distribution system has three pressure zones. These zones handle water service needs below the elevation of 740 feet. Because several portions of the planning area proposed for development are located at higher elevations, two additional pressure zones would be necessary. The new zones would require additional distribution mains, pumping facilities and storage tanks to 1,000 feet or above.

Mountain House. Water supply for domestic use on farms within the Mountain House subarea is provided by wells. The wells probably draw water from the Tulare Formation as well as from overlying alluvial deposits. Groundwater has been encountered at shallow depths 16 to 94 feet below ground surface in borings drilled at the adjacent Mountain House new town site. The shallow groundwater is drained from the agricultural fields by farm drains to lower the groundwater level. The shallow groundwater table is probably recharged from surface streams and overland flow during storms and irrigation periods. The quality of the groundwater resources in the area is marginal. Water from wells typically has relatively high total dissolved solid (TDS) concentrations. The high TDS is possibly related to salt water intrusion from the Delta or saline formation water. Relatively high concentrations of nitrates and sulfides have also been reported from wells in the area. High nitrate concentrations may be caused by livestock management at dairies or releases from household septic systems.

Irrigation water for agricultural use in the Mountain House sub-area is provided by the Byron-Bethany Irrigation District (BBID), a multi-jurisdictional district that provides water to adjoining areas of San Joaquin, Contra Costa, and Alameda counties. The BBID withdraws raw water from the intake to the California Aqueduct under a pre-1914 appropriative water right to divert water from the Sacramento-San Joaquin Delta. This water may be used for municipal, industrial, and agricultural uses. Current deliveries are only to agricultural customers; however,



if the Mountain House project is approved by San Joaquin County, the District has indicated that it would cooperate with the applicant to develop the water supply for service to the project. The pre-1914 water rights for BBID are based on past use, currently for irrigation water during the dry season (March through October). BBID has applied for winter water rights from the State Water Resources Control Board to serve year-round municipal demand from the Mountain House project. The Mountain House project intends to limit water consumption to the average historical water use by implementing various wastewater reclamation and water conservation techniques. Under the new town plan, approximately 600 acres of farmland in the Mountain House subarea would be irrigated with reclaimed wastewater.

Sunol. The San Francisco Water District (SFWD), which owns and operates the San Antonio and Calaveras reservoirs as a part of the Hetch-Hetchy system, is the major water purveyor to Sunol with the balance being supplied by the City of Pleasanton Water Department. The Sunol community's drinking water supply does not include groundwater or Alameda Creek water although a small number of customers along Niles Canyon Road receive their drinking water from Alameda Creek via the Sunol Aqueduct. The SFWD has recently initiated a master plan for its extensive watershed lands in the Sunol Valley.

West Pleasanton. Only a small portion of the West Pleasanton planning area is currently served by water agencies. The East Bay Municipal Utility District (EBMUD) serves a small number of rural residences at the mouth of Palomares Canyon. The Pleasanton Water Department supplies water to a handful of homes along Santos Ranch Road. The remaining rural residences rely upon well water. Service to this area would require annexation to a water district. EBMUD has established an "ultimate service area", beyond which water service will not be provided. The Zone 7 service area extends west to roughly the Eden-Pleasanton Township line, bisecting the West Pleasanton planning area. Approval by the Zone 7 Board of Directors would be required before Zone 7 water could be purveyed in this area.

Vargas Plateau/Fremont. The Alameda County Water District (ACWD) was founded in 1914 to serve the needs of the residents of the Alameda Creek watershed area, including Fremont, Newark, and Union City.

### **Water Supply and Demand Equation in Zone 7 Service Area**

It is the policy of Zone 7 to approve water delivery requests on a first request basis. The Zone is currently considering adopting a method of allocating future water supplies. Under this proposed policy Zone 7 would: continue to approve reasonable water delivery requests until demand exceeds existing supply; proportionately reduce or deny approval of new requests when demand exceeds supply for any upcoming water year; not approve arbitrarily large requests or increases in requests; and, enter into separate contracts, on terms to be negotiated, for delivery of water from expensive new permanent water supplies.

Municipal and Industrial Supply and Demand. Current M & I demand is about 31,250 acre-feet (133,000 people x .235 acre-feet per capita per year). Zone 7 estimates that its current water supply can meet the needs of a service area population of 174,000 to 192,000 people depending on the effectiveness of water conservation measures in reducing water demands.<sup>8</sup> Therefore, existing supply can provide for the needs of buildout of the existing general plans with a projected population of 171,000. If the facilities planned for the State Water Project are put into operation, the Zone could supply the needs of 210,000 to 231,000 people.

Agricultural Supply and Demand. Available water sources for agricultural use in the Livermore-Amador Valley are groundwater (3,000 acre-feet) and imported untreated water (3,500 acre-feet), for a total of 6,500 acre-feet. Current agricultural demand is about 3,300 acre-feet. Therefore, existing supply exceeds existing demand by roughly 3,350 acre-feet. Implementation of the South Livermore Valley Area Plan could bring an additional 3,260 acres under cultivation; water needed for this acreage could exceed existing water supply allocated for agricultural use by about 2,500 acre-feet.

### **Potential Future Water Supplies**

According to Zone 7 (1992), the following options are available to the Zone for increasing its reliable water supply: 1) water conservation; 2) additions to the State Water Project; 3) use of recycled water; 4) water marketing; and, 5) increased local storage. The currently estimated maximum potential amount of additional water from each of these sources is summarized in Table D-4 below. The individual amounts have not been totalled because it is extremely unlikely that all options could be realized; a more likely scenario is that future supplies would come from a combination of two or more options.

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<sup>8</sup> The 174,000 population assumes per capita use of 210 gallons per day (.235 acre-feet per capita per year) for urban uses (municipal and industrial); the 192,000 population assumes per capita use of 190 gallons per day (.213 acre-feet per capita per year) for urban uses, representing a 10 percent reduction in current per capita use.



TABLE D-4

**Summary of Possible Potential Water Supplies  
to Meet Future Municipal & Industrial Demands  
in the Zone 7 Service Area (in acre-feet)**

Existing M&I Supply	Water Conservation (10%)	State Water Project	Water Marketing	Additional Storage	Recycled Water*	Totals
40,900	---	---	---	---	---	40,900
40,900	4,100	---	---	---	---	45,000
40,900	---	8,400	---	---	---	49,000
40,900	---	---	14,300	---	---	55,200
40,900	---	---	---	20,000 to 50,000	---	60,900
40,900	---	---	---	---	25,000*	65,900

\* For potable and/or non-potable (agricultural and landscape irrigation) depending on the treatment standard.

Source: Zone 7, Water Supply Update, February 1992; Alameda County Planning Department.

Water Conservation. Zone 7 and its retailers are committed to water conservation efforts that are feasible for the District. The State Department of Water Resources (DWR) estimates that Best Management Practices (BMP) will eventually result in 10 percent to 15 percent water savings. Table D-5 lists 16 BMPs developed by the California Urban Water Conservation Council. The Council, with the assistance of the State Department of Water Resources' Water Conservation Office is currently circulating a Memorandum of Understanding (entitled MOU Regarding Urban Water Conservation in California, September 1991) to all water suppliers, public advocacy organizations, local jurisdictions, and other interested groups. Signatories of the MOU are committed to good faith efforts to implement these BMPs<sup>9</sup>. In the Zone 7 service area, two water retailers have signed the MOU agreement (California Water Service Company and Dublin-San Ramon Service District), although Zone 7 itself has not yet done so. (Zone 7 has, however, passed a resolution supporting the goal of water conservation and the BMPs.) The DSRSD estimates savings of

<sup>9</sup> The MOU also contains assumptions that can be used for calculating estimates of reliable future water conservation savings resulting from the BMPs.



6 percent in already developed areas and a 15 to 20 percent savings in new areas of development.

Additions to the State Water Project. Planned additions to the State Water Project include the Kern Water Bank, Los Banos Grandes Reservoir, and an additional four pumps. The four pumps and the Kern Water Bank are complete, although all permits to operate these facilities have not been obtained. Environmental review of the Los Banos Grande Reservoir is underway and construction could begin in 1995. Nevertheless, state or federal environmental constraints that could emerge from the current Bay/Delta proceedings may preclude the full use of these facilities. State Water Regional Control Board water-right decisions on the proceedings should be forthcoming by the end of 1992.

As shown in Table D-2, if the State continues with the planned additional improvements to the State Water Project, then the average yield of the State Water Project would increase to 3.66 million acre-feet, or 87 percent of the total contracted amounts. With the additional improvements, Zone 7 would receive an annual average of 40,100 acre-feet (87 percent of 46,000 acre-feet) from the SWP.<sup>10</sup> This would result in an annual increase of 8,400 acre-feet over present supplies.

Recycled Water. A recent study undertaken by Zone 7, the Dublin San Ramon Service District and the City of Livermore (Brown and Caldwell, May 1992) indicates that up to 25,000 acre-feet per year of treated recycled water could be used for recharging the groundwater basin and/or for surface irrigation. The recycled water recharged to and used over the main basin would be demineralized by reverse osmosis, a process which removes most dissolved salts and organic molecules by forcing treated wastewater through a semi-permeable membrane. (Importantly, the reverse osmosis treatment process can be adapted to meet varying performance standards associated with different potable or non-potable end uses.) The Brown and Caldwell study recommends three projects: the use of non-demineralized recycled water for landscape irrigation in the San Ramon Valley, Dublin and North Pleasanton areas; the use of demineralized recycled water for groundwater recharge to the Chain-of-Lakes; and the use of demineralized recycled water for streambed and basin recharge. Use of recycled water requires extraction and use of an equal amount of groundwater each year in order maintain the proper groundwater levels and dilution factor. Legislation is currently being considered that would provide grants and other financial incentives to use recycled water. This would help defray the high cost of developing recycled water estimated at \$1,000 per acre-foot. Recycled water facilities can be constructed in small units as needed, and, where cost-effective, the use of dual distribution systems provides for the most efficient use of water. Use of recycled water, when

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<sup>10</sup> Statistically, Zone 7 would receive less than 40,100 acre-feet 37 percent of the time and more than 40,100 acre-feet 63 percent of the time.

TABLE D-5

**Best Management Practices**

1. Interior and exterior water audits and incentive programs for single-family residential, multi-family residential and governmental/institutional customers.
2. Plumbing - New and Retrofit:
  - a) enforcement of requirement for ultra-low flush toilets in all new construction beginning January 1, 1992;
  - b) support of state and federal legislation prohibiting sale of toilets using more than 1.6 gallons per flush; and
  - c) plumbing retrofit.
3. Distribution system water audits, leak detection and repair.
4. Metering with commodity rates for all new connections and retrofit of existing connections.
5. Large landscape water audits and incentives.
6. Landscape water conservation requirements for new and existing commercial industrial, institutional, governmental and multi-family developments.
7. Public information.
8. School information.
9. Commercial and industrial water conservation.
10. New commercial and industrial water use review.
11. Conservation pricing.
12. Landscape water conservation for new and existing single-family homes.
13. Water waste prohibition.
14. Water conservation coordinator.
15. Financial incentives.
16. Ultra-low flush toilet replacement.

**Source:** California Urban Water Conservation Council

adequately managed, has few environmental side effects. The constraint on recycled water is the high energy cost of producing reverse osmosis water.

In order to proceed with the institutional arrangements necessary for implementing a water recycling program in the groundwater basin, the three principal agencies (see above) will seek a valley-wide "blanket" permit from the Regional Water Quality Control Board. Zone 7 will act as the lead agency with principal responsibility for obtaining the permit and enforcing its terms and conditions. The agencies will also develop a salt management program to ensure that recycling projects are undertaken within a framework that provides for maintenance and enhancement of groundwater quality and protection of the basin's groundwater resources. (Refer to the *Wastewater* background report in Section D for additional information.)

Water Marketing. The concept of water marketing is that water supplies can be purchased by water deficient agencies from agencies with surplus water. (A surplus usually comes about by reasons of conservation, conjunctive groundwater use, change in crop patterns, and/or fallowing land in dry years.) A number of legislative bills are under consideration to ease the process of purchasing water. In 1991, due to drought-related water shortages, Zone 7 purchased "emergency bank" water from the state for a cost of \$200 per acre-foot.<sup>11</sup> ("Emergency bank" water is available for purchase when the amount of water received from the SWP system is less than 75 percent of normal demand in the service area.) Zone 7 believes that, on a small scale, water purchases will be a viable alternative for an additional water supply. The potential purchase amount at this time is viewed as that which could be delivered through the existing state system, i.e., the full 46,000 acre-feet. The increase to the Zone's present water supply could be 14,300 acre-feet annually (the difference between 46,000 acre-feet and 31,700 acre-feet, the average annual yield under existing conditions).

Increased Local Storage. Studies by Zone 7 and other South Bay Aqueduct contractors have identified potential off-stream storage sites that could provide up to an additional 50,000 acre-feet per year by maximizing the delivery capability of the South Bay Aqueduct. The water supply would come from a combination of purchasing surplus water from the state and other water delivery systems in wet years, and from the water marketing concept previously mentioned. Zone 7's share of increased local storage capacity would be approximately 20,000 acre-feet per year. In place of constructed off-stream storage it would be possible for Zone 7 to store the additional deliveries from the South Bay Aqueduct in the underground aquifers.

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<sup>11</sup> Zone 7 residential customers currently pay about \$400 per acre-foot at the tap, or about \$80 per person. The final price to residential customers is affected primarily by the cost of treatment and delivery of the water. Even if some fraction of the total supply becomes more expensive, the final rates to the customer would not increase much. (MacKay & Soms, March 1992)



Additional future storage not mentioned by Zone 7 in their February 1992 report could be made available under the "Chain-of-Lakes" Specific Plan for the Livermore-Amador Valley Quarry Area. Under the Specific Plan, portions of the three existing gravel quarries will be reclaimed as a series of connected "lakes" for water conveyance, surface water storage and flood control facilities. Waters from the Arroyo Mocho and Arroyo del Valle will be diverted into the "Chain-of-Lakes". After storage and conveyance via the "Chain-of-Lakes", water would percolate into the ground through the exposed aquifer. The first of these lakes would not be available to Zone 7 until the quarries are mined out after the year 2000. The last of the lakes, necessary to give Zone 7 a complete system, is not likely to be available until after the year 2020. The potential additional increase in storage resulting from implementation of the "Chain-of-Lakes", up to 30,000 acre-feet for Lakes H and I and up to 48,000 acre-feet for Lakes A through G, could allow the Zone to purchase and store excess SWP water during wet years and to store and recharge recycled water. Use of one or more of these lakes for surface storage would require the use of natural or synthetic pond liners.

## ■ TRENDS

### **Future Water Supply in the Planning Area is Increasingly Uncertain**

Drought conditions have existed in the county since 1987; rainfall levels are below average and groundwater levels have declined. The drought has also affected the ability of the State Water System to deliver contract entitlements. Other factors which decrease the level of supply predictability include increasing competition for water from municipal, environmental and agricultural interest groups as well as a complex variety of possible state and federal legislative, regulatory, and legal actions which could significantly affect the local and statewide water use equation. Of particular importance are the forthcoming standards in flow and export limits for the Sacramento-San Joaquin Delta estuary, the implementation of which could significantly reduce the average amount of water Zone 7 receives from the State Water Project. The new standards would also affect the likelihood of completing the SWP planned facilities and thus the likelihood of Zone 7 ever receiving its maximum entitlement.

### **Water is Becoming an Embattled Resource**

As water becomes scarcer and future supplies more uncertain, all elements of the community are becoming increasingly concerned about protecting their interest in this limited resource. Many existing residents are fearful that the East County is growing beyond its resources and that the costs of new water would be shared by existing users; environmentalists would like to be assured that essential water needed to support wildlife and plant communities not be jeopardized; agriculture is concerned about competition from increasing urban demand; developers would like assurances that water be available to support their investments; and

local governments would like similar assurances that growth, on which economic prosperity is contingent, can be accommodated. Despite differing concerns, most members of the community agree that more certainty in the future allocation of water would result in more efficient planning for the future.

### **Water Conservation and Water Recycling Achieve a More Prominent Role**

Uncertainty regarding future droughts, the difficulty of finding new water sources, potential cutbacks in water allocations, water demand approaching the limits of water supplies, and rising water costs are all likely to contribute to the need for ongoing water conservation efforts in the East County. These same factors are likely to focus new attention on water reclamation as a way of increasing the East County's water supplies. The next decades are likely to see increased efforts to overcome the obstacles to large scale water reclamation and reuse. Current obstacles include the high cost of current reclamation technologies and the public concern over the effect of percolating reclaimed water into groundwater supplies.

## **■ PLANNING ISSUES**

Given the complexity of the water equation and the uncertainty over future supplies, it is impossible to estimate with any degree of precision how much water will be available to serve future needs and where that water will come from. Different assumptions will yield different supply-by-source figures. For example, Kennedy/Jenks Consultants, in a recent water supply report (April 1992), placed existing water supply about 5,000 acre-feet higher than the 51,900 acre-feet used here. Nevertheless, the "ballpark" estimates used in this report are useful in addressing the feasibility of providing water for growth and in determining what steps need to be taken to make growth possible given the present uncertain situation.

Using the assumptions described under the Existing Conditions discussion, the present water supply for the planning area is insufficient to meet the needs of the projected population by 2010 or for buildout of the cities' general plans *and* current general plan amendments (refer to Table D-6). In order to meet these respective demands, the water supply will have to be increased by about 14,000 acre-feet in the next twenty years and by about 21,000 acre-feet at some later point in time. (If water conservation practices cannot reduce demand, these figures would be higher by 10 percent.) If goals for irrigated agriculture under the South Livermore Valley Plan are realized, the total amount of needed future water would increase by up to 2,500 acre-feet, although the termination of gravel mining in the Livermore-Amador Valley would free some of the 3,000 acre-feet which could be applied for agricultural use.



<b>TABLE D-6</b> <b>Water Supply Surplus/Deficit of Future Growth Scenarios</b> <b>(In Acre-Feet Rounded to Nearest 50)</b>			
<b>Future Growth Scenarios</b>	<b>Future Demand<sup>1</sup> w/no Savings w/10 % Savings</b>	<b>Existing Supply (As Defined by Zone 7)</b>	<b>Surplus or (Deficit)</b>
<b>Buildout of Existing General Plans (pop.171,000)</b>	40,200 36,400	40,900	700 4,500
<b>Buildout of Prospective General Plans<sup>2</sup> (pop.290,000)</b>	68,150 61,750	40,900	(27,250) (20,850)
<b>ABAG 2010 Population Projections (pop.259,000)</b>	60,850 55,150	40,900	(19,950) (14,150)
<b>Notes:</b> <sup>1</sup> Future demand is estimated without and with savings from water conservation practices (0.235 and 0.213 af per capita per year, respectively).  <sup>2</sup> Prospective general plans comprise adopted plans plus proposed general plan amendments.			
<b>Source:</b> Alameda County Planning Department			

At issue is the feasibility of securing additional water at affordable cost to meet future water needs. Given the number of potential new sources together with strategies to store surplus water, the procurement of sufficient water for projected and planned growth (anywhere from 14,000 to 21,000 acre-feet as a ballpark estimate) is feasible. Zone 7 has begun a process to identify new water sources and to estimate costs and delivery schedules. Especially promising are purchased "water transfers" coupled with the use of surface storage reservoirs such as the Chain-of-Lakes, a potential storage and recharge system. It is recommended that Lakes H & I become operational as soon as possible in order to begin accumulating surplus water for future use. At the very least, 25,000 acre-feet of potable recycled water could be made available on a schedule that could meet anticipated growth.



Although anticipated growth under prospective general plans will probably not be inhibited by lack of water, the problem of who should have priority rights to existing supplies (at existing cost) is not addressed under Zone 7's present first-come first-serve policy. Fairness seems to require that the water needs of development already anticipated under existing adopted general plans (as of June 1, 1992) should take precedence over the water needs of new development now proposed for prospective general planning areas, and that costs for new water should be absorbed by new development in prospective general planning areas that will require new sources of water.

How the higher cost of new water will affect the viability of new development is not known. Infrastructure costs to upgrade the existing water distribution system, sized for maximum SWP flows of 46,000 acre-feet, will have to be added to the higher costs of water. Potential problems associated with higher costs for new water are: possible adverse affects on the financial ability of developers to provide affordable housing and other socially beneficial but costly land use programs; and higher than anticipated costs for new water making a project infeasible after the initial stage of development.

Policies which encourage the comprehensive and long-range allocation of water would benefit all interest groups in the community. Other planning considerations include how best to promote water conservation and recycling in the planning area.

## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Encouraging Zone 7 and water retailers to secure new water supplies*
- *Support for development of a comprehensive, long-range water management plan for the Zone 7 Service Area*
- *Maintenance of existing water service standards*
- *Development of an equitable solution on the issue of who pays the higher cost of new water*
- *Prevention of premature extension of water infrastructure*
- *Control of the location of future water infrastructure*

- *Requiring proponents of new development projects to verify the adequacy of the water supply to serve their development prior to approval*
- *Requiring that each phase of new development be self-sufficient in terms of services and amenities given the uncertainty of buildout if water for succeeding phases cannot be procured*
- *Encouragement of more efficient use of domestic and irrigation water through conservation, cost-effective water recycling programs, and implementation of Best Management Practices*
- *Protection of groundwater recharge areas*
- *Use of recycled water for agricultural irrigation*

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## WASTEWATER

### ■ INTRODUCTION

This report describes the existing municipal and discrete wastewater treatment and export systems, as well as relevant policies and regulations pertaining to wastewater treatment, including individual septic tank use. Emerging trends, including wastewater reclamation and reuse, are also discussed. Figure 20 shows the locations of sewer service areas and major wastewater facilities in the East County.

### ■ EXISTING CONDITIONS

#### Municipal Systems

Almost all of the planning area is within the Alameda Creek watershed, which drains the Livermore/Amador Valley via Niles Canyon to the southwest. The Livermore/Amador Valley is underlain by an extensive groundwater aquifer (see the *Hydrology and Water Quality* background report in Section E) that provided the major source of water during the first half of this century. Following the completion of the South Bay Aqueduct in the early 1960's, abundant water and a growing population led to the rapid increase in the volume of sewage effluent produced in the Valley. Lacking ready access to an ocean outfall, treated wastewater from several municipal facilities was either placed in evaporation ponds, applied to the land for irrigation, or pumped into the Valley stream channels that feed Alameda Creek.

Concern from downstream users, particularly the Alameda County Water District which relies on Alameda Creek for recharge of groundwater in the Niles Cone, as well as concern about groundwater quality in the Valley, led the San Francisco Regional Water Quality Control Board (RWQCB) to set standards for waste discharges from the Livermore and Pleasanton sewage treatment plants in the late 1960's. Because the groundwater basin has no significant outflow, of particular concern was buildup of salts in the groundwater, measured in total dissolved solids (TDS). In 1975, the RWQCB's *Basin Plan* established a 250 mg/l (milligram per liter) TDS objective for surface waters, effectively prohibiting direct discharge of wastewater into Alameda Creek tributaries.

Livermore-Amador Valley Water Management Agency. To meet the *Basin Plan* requirements, Livermore, Pleasanton and the Dublin-San Ramon Service District (DSRSD) formed a joint-powers agency, the Livermore-Amador Valley Water Management Agency (LAVWMA), to jointly plan and build a new wastewater system. After considerable study, LAVWMA proposed a new system that would include consolidation of treatment at the Livermore and DSRSD plants, exporting the treated effluent out of the Valley via a 15.62 mgd (million gallons per day) pipeline that parallels I-580. The pipeline would connect with an East Bay Dischargers



Authority pipeline in Hayward, with eventual outfall in San Francisco Bay near Oakland. Construction of the new system was completed in 1980.

Partly due to Environmental Protection Agency restrictions on federal funding, the LAVWMA system was sized to accommodate only the 1995 needs of the LAVWMA area as projected in 1975. In 1983, improvements were made that increased pipeline capacity to 16.62 mgd. Additional modifications in 1987 increased capacity to 19.7 mgd. A further 1.3 mgd of interruptable capacity is available through 1996.

#### Wastewater Treatment Plants.

***Dublin San Ramon Service District Treatment Plant.*** The DSRSD Treatment Plant is located in the City of Pleasanton and treats wastewater collected from the City of Pleasanton service area and the DSRSD service area. The City of Pleasanton collection area includes all developed areas within the city limits and the Castlewood Country Club area, which is presently unincorporated. The DSRSD collection area includes the City of Dublin, the southern portion of the City of San Ramon (located in Contra Costa County), the US Army Camp Parks facility, and Alameda County's Santa Rita jail facility.

The DSRSD Treatment Plant has a design capacity of 11.5 MGD-ADWF (million gallons per day--average dry weather flow). This capacity is equal to DSRSD and Pleasanton's share of the LAVWMA export pipeline. Since the export capacity of the treatment plant is restricted by the LAVWMA pipeline, the plant assigns capacity limits to its member cities. The City of Pleasanton has an allocation of 7.1 MGD-ADWF and DSRSD an allocation of 4.4 MGD-ADWF. Existing flow at the plant is about 8.1 MGD-ADWF. Sewer permits are granted on a first-come, first-serve basis with industrial and residential projects competing equally for available permits.

***Livermore Water Reclamation Plant.*** The Livermore Water Reclamation Plant is located in the City of Livermore and is owned and operated by the City of Livermore. The plant treats wastewater from the City of Livermore and from the Lawrence Livermore National Laboratory and the Sandia Corporation facilities. Some of the treated effluent from the plant is used for landscape irrigation at the Livermore Municipal airport and golf course. The City of Livermore recently increased the capacity of its reclamation plant from 6.25 MGD-ADWF to 7.3 MGD-ADWF. Under Phase II of the current expansion plan, which is scheduled for completion by summer 1993, plant capacity will increase to 8.5 MGD-ADWF, equal to Livermore's share of the LAVWMA export pipeline.

The City grants sewer permits based on a growth rate revised each three years and splits remaining capacity evenly between residential and non-residential uses. In granting new sewer permits, wastewater flows are estimated at 80 gallons per day (GPD) per capita and 70 GPD per employee for planning purposes. The current remaining treatment capacity for residential uses is about 0.29 MGD.

The capacity of the LAVWMA export pipeline will be fully allocated by the mid-1990s and reach its physical capacity by the year 2000. Total remaining sewage export capacity is

estimated to be fully utilized in Pleasanton and DSRSD by 1997, and Livermore by 2000. Since sewer allocations precede actual development and sewer use, the jurisdictions are likely to exhaust their sewer allocations and subsequent ability to approve new development before the actual sewer capacity runs out. Table D-7 below summarizes this information:

<b>TABLE D-7</b>  <b>Remaining Sewage Export Capacity and Projected Year Capacity is Fully Utilized: Livermore, Pleasanton and DSRSD<sup>1</sup></b>				
<b>Category</b>	<b>Pleasanton (MGD)</b>	<b>Livermore (MGD)</b>	<b>DSRSD (MGD)</b>	<b>Total (MGD)</b>
<b>Total Capacity</b>	7.106	8.229	4.385	19.720
<b>Existing Flow<sup>2</sup></b>	4.495	5.000	3.569	13.064
<b>Remaining Capacity<sup>3</sup></b>	2.611	3.229	0.816	6.656
<b>Projected Year Capacity is Fully Utilized</b>	1997	2000	1997	
<b>Projected Year Allocations are Fully Utilized<sup>4</sup></b>	1994 to 1995	1997 to 1998	1996	
<b>Notes:</b> <sup>1</sup> Measured in terms of millions of gallons per day (MGD) for average dry weather flow (ADWF). <sup>2</sup> Existing flow as of the following dates: Pleasanton 8/88; Livermore 1/89; DSRSD 7/89. <sup>3</sup> Includes reserve allocations set aside for projects that have yet to be developed or have vacant space. <sup>4</sup> Allocations represent when development has been approved under each jurisdiction's growth management program.				
<b>Source:</b> <u>Final Report, Growth Inducing Impacts Analysis of Tri-Valley Wastewater Authority Export Capacity Expansion</u> , prepared for TWA by Economic and Planning Systems, Inc., April 1990.				

Tri-Valley Wastewater Authority. In recognition of the LAVWMA capacity limits, the Tri-Valley Wastewater Authority (TWA) was created in 1986 to plan and build a new system to export additional wastewater out of the Valley. TWA is a joint-powers agency that includes DSRSD, Alameda County, and the Cities of Pleasanton and Livermore.

In 1987, after considerable study of various alternative systems, the TWA Board of Directors chose to pursue construction of a new pipeline, paralleling the LAVWMA pipeline, that would export untreated sewage to the East Bay Municipal Utility District (EBMUD) treatment plant in Oakland for treatment and disposal in San Francisco Bay. Several parties successfully



challenged the environmental document for the project, and the TWA Board rescinded its approval. EBMUD subsequently withdrew its offer to accept wastewater from TWA.

TWA is pursuing an alternative system that will export untreated effluent north to a Central Contra Costa Sanitary District (CCCSD) pipeline in San Ramon, where it will be pumped to the CCCSD plant north of Concord for treatment before disposal in Suisun Bay. TWA is in the process of completing environmental documentation and determining how capacity will be allocated among the member agencies.

In January 1992, TWA released a draft Subsequent Environmental Impact Report (SEIR) which evaluates several currently feasible wastewater treatment and export alternatives. The draft SEIR also studies implementation of the export system under three different capacity alternatives, each capacity alternative corresponding to a different development scenario. Export requirements under these development scenarios (calculated in average daily dry weather flows), are shown in Table D-8 below. No decision on the TWA project will be made until environmental review of the project is completed.

<p><b>TABLE D-8</b></p> <p><b>Additional Sewage Export Requirements</b></p> <p><b>Given Projections of Employment and Population Potential</b></p> <p><b>in the TWA Service Area (Average Daily Dry Weather Flows)<sup>1</sup></b></p>			
Scenario	Total Export Capacity Needed to Accommodate Growth (MGD)	Existing Export Capacity (MGD)	Export Expansion Required to Accommodate Growth (MGD)
Existing General Plans	36.36	19.72	16.64
Prospective General Plans <sup>2</sup>	45.80	19.72	26.08
Constrained General Plans <sup>3</sup>	29.46	19.72	9.74
<p><b>Notes:</b> <sup>1</sup>Based on sewer use estimates of 70 gallons per day per employee and 80 gallons per day per resident.  <sup>2</sup>Includes proposed General Plan Amendments in North Livermore, Pleasanton Ridge, East Dublin, West Dublin and Tassajara and Dougherty Valleys.  <sup>3</sup>Level of commercial and residential development that could be accommodated if no residential general plan amendments are approved.</p> <p><b>Source:</b> <u>Final Report, Growth Inducing Impacts Analysis of Tri-Valley Wastewater Authority Export Capacity Expansion</u>, prepared for TWA by Economic and Planning Systems, Inc., April 1990.</p>			



The proposed agreement with CCCSD will limit export of effluent to 40,000 MGD-AWWF (average daily wet weather flow). Average wet weather flow includes storm water leakage into the sewer system, which can substantially increase the amount of flow. With the proposed CCCSD agreement, TWA is projected to have adequate capacity to serve development conforming with existing General Plans and proposed General Plan amendments (although this may require large equalization basins for on-site storage of untreated wastewater during wet weather periods). TWA estimates that, following approvals, the export system will take several years to construct.

### **Septic Tanks**

Most of the rural, unincorporated portions of the East County depend on individual septic tanks for sewage disposal. The Environmental Health Department of the Alameda County Health Care Services Agency requires all residences to be connected to a sanitary sewer system administered by a public agency, unless there is no public sewer within 200 feet and the property exceeds 40,000 square feet in area, in which case a septic tank can be used if approved by the County Health Officer.

The Alameda County Flood Control and Water Conservation District, Zone 7 is responsible for managing and protecting the surface and groundwater resources of the Livermore-Amador Valley. The groundwater basin has been divided into twelve subbasins by the California Department of Water Resources, based on fault traces and hydrologic discontinuities. For regulatory purposes, the Amador, Mocho and Bernal subbasins are considered the "Central Basin", while the remaining basins are considered "fringe" basins.

Other than overflow into Arroyo de la Laguna to the west, the Valley groundwater basin has no natural outlet, and the State RWQCB has historically expressed concern over the long-term maintenance of water quality in the basin, especially salt build-up. With groundwater pumping by quarry operators in the central portion of the Valley, overflow into Arroyo de la Laguna is severely limited.

Of particular public health concern are nitrate levels. Through nitrification and leaching, nitrogen from various sources can increase levels of nitrates in the groundwater. High nitrate levels in residential well water can cause an illness in infants (methemoglobinemia or nitrate cyanosis, sometimes called "blue babies"), and may be partially responsible for the occurrence of goiter.

Several rural residential areas with homes on one to five acre lots that relied on septic systems and well water on highly permeable soils south of the City of Livermore reported high nitrate levels in residential water supplies. In 1973, responding to these concerns, the Alameda County Board of Supervisors adopted a "Rural Residential Development Policy" for the location, zoning and servicing of new rural residential development. The policy included the condition that new rural residential development must conform with RWQCB policies regarding protection of groundwater, with no discharge of wastewater to stream channels.

In 1982, at the urging of the RWQCB, Zone 7 adopted the *Wastewater Management Plan for the Unsewered, Unincorporated Area of Alameda Creek Watershed Above Niles* (WMP). The WMP contains specific water quality objectives for the Valley, wastewater management policies designed to achieve those objectives, and recommendations regarding the implementing agencies. A central policy of the wastewater management plan is to prevent degradation of the central groundwater basin by controllable factors, such as requiring the export of all wastewater effluent to minimize salt and other pollutant loadings in the Central Basin.

Specific Zone 7 policies regarding individual on-site wastewater systems (septic tanks) include:

- 1) Discouraging onsite wastewater systems (septic tanks or alternatives).
- 2) Establishing a minimum lot size of five acres for use of septic tanks.
- 3) If more intense development proposing septic tanks is to be authorized in any area, and/or when land use zoning is changed to rural residential use with septic tanks, then:
  - a. The minimally generally acceptable lot size should be five acres.
  - b. A site-specific "geohydrologic study" may be required if a cluster of five or more units is proposed, to determine compliance with the plan. An on-site wastewater management zone, formed under Zone 7 or the County, and an approved septic tank and ground water monitoring program would be required. Larger lot sizes may be required in special cases.
  - c. Holding tanks will be required for new development within 1,000 feet of the proposed gravel pit lakes, particularly along Arroyo del Valle.

In addition, the WMP identified eight existing rural residential areas for specific management policies regarding wastewater disposal, including Central-Scenic, Buena Vista, Lomitas-Bess-Marina, Happy Valley, Sunol-Kilkare, East Tesla, the Las Positas Valley, and the Tassajara Valley. While the WMP concluded that local septic tank problems are not severe enough to require immediate sewerage, the areas will be monitored for further water quality degradation. Should local septic tank problems become severe, or if additional development is proposed or adjacent areas urbanize, the WMP recommends that the areas should be sewerage.

In 1986, the RWQCB incorporated Zone 7's WMP as part of the amended Basin Plan, making the policies enforceable by the State.

Because the WMP primarily focused on residential septic systems, Zone 7 adopted a policy concerning industrial and commercial use of septic tanks in 1986. The policy states that because the use of septic tanks for new commercial or industrial uses generally produces unacceptable risk to the quality of the groundwater, such use should be prohibited where it overlies the Central Basin, any of its fringe areas or subbasins, or any body of groundwater hydrologically connected with the Central Basin, "unless it can be satisfactorily demonstrated to Zone 7 that



the wastewater loading will be no more than the loading from an equivalent rural residential unit and said septic tanks will be in compliance with all other conditions and provisions."

### **Discrete ("Package") Treatment Plants**

Several small treatment plants that are not connected to the LAVWMA pipeline operate in the planning area, relying on land disposal or stream discharge. The U.S. Veteran's Administration hospital on Arroyo Road, south of Livermore, and the G.E. Vallecitos plant on Route 84, south of Pleasanton, both use discrete treatment plants. In addition, the Castlewood rural residential area west of Pleasanton relied on a discrete treatment plant until the mid-1980's. Several new development projects, most recently the Ruby Hill residential development, have proposed the use of new discrete treatment plants, although to date none have been constructed.

The Veteran's Administration treatment facility was originally constructed in 1951, with a design flow of 0.5 mgd of secondary treatment, which provides more than adequate capacity for the facility. Effluent is discharged to three interconnected percolation ponds; the sludge is digested, sent to drying beds, and then to a sanitary landfill for ultimate disposal. Due to concerns about elevated nitrate and TDS levels, the medical center is required to continue monitoring groundwater impacts. The current RWQCB permit requires submittal of a report by September, 1992 on the cost and feasibility of either connecting to the Livermore sewer system or increasing the level of on-site treatment to comply with Basin Plan objectives.

The Vallecitos Atomic Laboratory uses an onsite secondary wastewater treatment plant for sanitary wastewater. An average daily dry weather flow of 4,000 gallons is used for spray irrigation on the G.E. property. Industrial non-contact cooling water is discharged into nearby Vallecitos Creek. The facility has not had any known problems.

Until recently, the Castlewood Country Club relied on a discrete treatment plant operated by Alameda County. The plant, constructed before 1956, provided secondary treatment with effluent discharged to a series of percolation and evaporation ponds. In 1984, the facility had an estimated average dry weather flow of 50,000 gpd, although it was designed for only 35,000 gpd. Periodic overflows into the Arroyo de la Laguna resulted in the plant's shutdown and connection of the Castlewood area to the DSRSD treatment plant.

Following several proposals for additional discrete treatment plants, the Alameda County Board of Supervisors adopted a "Discrete Sewage Disposal System Policy" in 1978. The policy states that discrete community systems should be used only to correct an existing water pollution problem where connection to an existing conventional system is not feasible, or where determined acceptable by the Board of Supervisors and the RWQCB on the basis of an EIR for a specific project. Approved facilities must: utilize a proven design by an experienced engineer; allow repair without bypassing inadequately treated wastewater; be capable of continuously providing a disinfected, secondary treated effluent; assure that TDS concentrations do not exceed the level in the local domestic water supply; and have disposal areas that minimize public exposure and environmental degradation. In addition, management and financing should be provided either by Zone 7 or through creation of or use of an existing County service area.



Operational services should be provided by a County entity, such as the Public Works Agency or the Health Care Services Agency.

Zone 7's 1982 WMP also includes specific policies regarding discrete community wastewater treatment facilities. Although the WMP calls for the export of all effluent, limited land application may be acceptable "only after a feasibility study by Zone 7, or other entity, finds export not feasible." Wastewater treatment with land application may be permitted if one of the following conditions is met:

- 1) The percolate at the groundwater table meets the WMP groundwater quality objectives and does not cause poor quality rising groundwater to violate any water quality objectives.
- 2) The applied wastewater effluent has less than 250 mg/l TDS, does not cause any significant local problems, and does not cause rising groundwater to create water quality problems in the Central Basin and Niles Cone areas.
- 3) The application point is in the fringe subbasin or upland and highland area, and it can be shown that the project, because of its size and location, together with other possible projects in the area, will not cause adverse water quality effects either locally or in the Central Basin or Niles Cone areas. The site specific study will have to demonstrate that the percolate cannot reasonably be expected to move over time, either directly or indirectly, into the Central Basin or Niles Cone area and degrade or pollute the groundwater. All other State and Federal standards must be met.

The WMP also states that each proposed community system will be considered on a case-by-case basis, after consideration of overall wastewater disposal needs, site-specific studies of the soils, geohydrology, groundwater, and impacts on the groundwater. Proliferation of small, inefficient plants should be avoided. If demineralization is proposed, the effluent should--if physically, financially, and institutionally feasible--be used to replace poor quality wastewater being used for irrigation. Adding wastewater to the groundwater in a manner that would force poor quality water into the streams must be avoided. Direct discharge of wastewater to streams is prohibited during dry periods, except as permitted by the RWQCB in accordance with the Basin Plan.

The 1986 amendments to the Basin Plan incorporated Zone 7's WMP policies for discrete systems. In addition, the RWQCB set specific water quality standards for wastewater effluent and groundwater in the central and fringe basins. The Basin Plan requires that operation and maintenance of discrete sewerage facilities be legally assumed by a public entity and that failsafe measures for effluent disposal must be provided in the event of: peak wet weather flows; other quantities in excess of reclamation needs; spillages; process upsets; and catastrophic occurrences.

### **Water Reclamation and Reuse**

Water reuse in California dates back to the early 1900s when treated effluent was used for agricultural irrigation in the Pomona area. Some 240 wastewater reclamation plants throughout the state produce about 830,000 acre-feet per year (AFY) of reclaimed water. Reclaimed water

is used for groundwater recharge, landscape irrigation, and industrial applications, in addition to agricultural irrigation.

Wastewater reclamation and reuse has been studied extensively in the Livermore-Amador Valley. Since 1967, the City of Livermore has been reclaiming wastewater effluent, through sand filtration and chlorination, to provide irrigation water supplies for the Las Positas Golf Course, the Livermore Municipal Airport, and local treatment plant landscaping. Currently, these wastewater reclamation efforts average about 0.83 mgd, with a peak summer demand of 1.52 mgd. Reclaimed water was also used by Caltrans for landscape irrigation along the right-of-way of Interstate 580, but this practice has been stopped since the vegetation seems to be maintained through natural rainfall.

To meet Zone 7 and RWQCB standards regarding TDS, further use of reclaimed water will require demineralization technology to remove salts from treated, disinfected wastewater prior to reuse. While several demineralization technologies are available, the preferred process is reverse osmosis, which basically uses pressure to force water through a series of semi-permeable membranes to remove salts and organic material.

The City of Livermore is proposing to construct a demonstration "Advanced Water Reclamation Plant (AWRP) at its existing wastewater treatment plant to demonstrate the ability to reliably and cost effectively meet the water quality requirements for reuse in the Livermore Valley. The AWRP would utilize a reverse osmosis process to produce a high quality effluent suitable for reclamation as one alternative for accommodating planned future disposal capacity demand and potentially augmenting local groundwater supplies. The demonstration plant would produce 0.75 mgd of demineralized effluent that would exceed water quality standards for unrestricted reuse. The facility will also generate three tons/day of dewatered sludge, which would be disposed of in a designated landfill, and 0.13 mgd of brine, which would be disposed of through the LAVWMA pipeline. Livermore plans to use the demineralized water to upgrade the quality of filtered secondary effluent currently being used for irrigation of the Las Positas Golf Course.

If, after two years of operation, the demonstration plant indicates it is feasible, Livermore plans to expand the facility to an ultimate capacity of 6.5 mgd. Precise use of this reclaimed water has not yet been determined. A study commissioned by the City in 1989 found three viable disposal/reuse alternatives, including summer irrigation of golf courses and vineyards with winter stream discharge into the Arroyo Las Positas; summer irrigation with winter storage of excess reclaimed water; and year-round stream discharge for eventual recharge into groundwater aquifers or flow into San Francisco Bay.

A water recycling study was authorized in 1991 as a joint project of Zone 7, DSRSD, and the City of Livermore to investigate a feasible program for water recycling while providing adequate protection and enhancement of the groundwater basin water quality. The study, completed in 1992, analyzed a number of potential projects for reuse of reclaimed water, and determined that water recycling is a viable method of supplementing limited water supplies in the Valley and meeting wastewater disposal needs as well.



The study recommends the development of a Long-Term Recycling Program in the Tri-Valley area that would focus on three projects with a potential reuse volume of 10,600 AFY (current) to 25,500 AFY (future), at a cost of \$880 to \$1,180 per acre-foot. The three projects include use of non-demineralized recycled water for landscape irrigation in the San Ramon and Dougherty Valleys, Dublin, and the Stoneridge and Hacienda Business Park areas in north Pleasanton; recharging the Central Groundwater Basin with demineralized recycled water via the Chain of Lakes; and use of demineralized recycled water for groundwater recharge through stream and basin recharge.

The study also recommends that Zone 7 act as the lead agency in obtaining a blanket permit from RWQCB for a water recycling program. In addition, a salt management program will be developed to ensure that recycling projects are undertaken within a framework that provides for maintenance and enhancement of groundwater quality and protection of the Valley's groundwater resources.

## ■ TRENDS

### **LAVWMA Export Capacity Will Be Exceeded in the Near Future**

Projections made for TWA indicate that LAVWMA export capacity will be reached by the turn of the century. Because of the lag between allocation and use, allocation of capacity to new development projects will be reached in the next five years. The 1992 Pleasanton Growth Management Report indicates that Pleasanton's share of the LAVWMA capacity could be utilized prior to 1996. Additional export capacity will be required if development envisioned in existing general plans is to be accommodated.

### **TWA Facilities, As Proposed, Will Be Able To Accommodate Growth**

Barring further delays, a new wastewater export system, operated by TWA, could be operational by the time LAVWMA capacity is reached. However, no final decisions have been made to date regarding the proposed TWA system, allocations to specific agencies, or the expected completion date. The preferred alternative now being considered by the TWA Board would accommodate development under existing general plans, as well as proposed general plan amendments, if large-scale equalization basins are used to store wet-weather flows. Basin Plan requirements for export, together with the cost of alternative systems, will ensure that the TWA system will be the most economical method of wastewater disposal for urban development, making the allocation process of capacity an important component of land use planning.

### **Water Reclamation Will Play a More Prominent Role**

The recently-completed Livermore-Amador Valley Water Recycling Study indicates that more efficient reverse osmosis technology, together with the increasing cost of alternative water sources and exporting wastewater, will make reclamation of wastewater an economically viable alternative. Water reclamation on a large scale (10,000-25,000 acre-feet/year) would reduce wastewater export requirements (although brine and sludge would still need to be exported),



make a comparable amount of water available for other uses, and require a shift towards using more groundwater relative to surface or imported water.

Development of more economical and reliable reverse osmosis treatment systems will also permit the use of RO treatment for discrete, or "package", systems that will meet the requirements of the Basin Plan and WMP. Such systems would potentially allow large-scale development that would not need to rely on municipal wastewater treatment and export systems, and would likely reduce the need for off-site water sources.

### **Rural Development Will Continue To Be Constrained By Septic Limitations**

State and Zone 7 groundwater protection policies strictly limit rural residential, commercial or industrial development that cannot be connected to a municipal system or that cannot financially support an acceptable discrete system. Rural residential development that will rely on septic tanks located within the groundwater basin will be limited to parcels of five acres or more, with strict requirements for clusters of five or more units. Commercial and industrial uses that would rely on septic tanks are prohibited, unless it can be shown to the satisfaction of Zone 7 that sewerage needs will not exceed that generated by a rural residence.

## **■ PLANNING ISSUES**

Unless planned TWA facilities are completed within the next five years, lack of sewage export capacity will limit further growth in the East County. Development envisioned in existing city general plans will not be accommodated. Additional development, such as East Dublin and North Livermore, will be delayed until an export system is in place.

The preferred alternative now being studied by TWA, which would export untreated wastewater north to the Central Contra Costa Sanitary District treatment plant, can accommodate existing and proposed development within the Livermore-Amador Valley, if equalization basins are constructed for wet-weather storage of untreated wastewater.

Assuming a TWA facility is in place, allocation of sewage capacity among the member agencies will be a strong determinant in the ultimate ability to develop. Cost and groundwater protection policies will largely limit urban development to areas connected to the TWA facility.

Improvements in RO technology are likely to make it a more viable alternative to conventional wastewater treatment. Municipal RO plants could reduce the amount of wastewater needing to be exported, while providing a "new" source of water for landscape and agricultural irrigation, groundwater recharge, or other uses. RO technology will also decrease the need for large-scale urban development projects to be "hooked up" to city water and sewer services. As the approved Ruby Hill project indicates, "stand alone" wastewater treatment plants, utilizing RO technology, can be developed that will meet State and Zone 7 requirements and provide supplemental water for landscaping and agriculture. By allowing large-scale urban development that doesn't need to be tied directly to city services, RO technology could result in a proliferation of projects with a more dispersed development pattern.

If RO technology is used by individual development projects, disposal of several by-products will need to be addressed. The RO process results in the removal of salts from the treated water, resulting in the accumulation of brine. Brine disposal could be by two methods: using the LAVWMA pipeline, as is proposed for the Livermore demonstration project, or trucked offsite to a suitable disposal site, as was proposed for the Ruby Hill project. The latter course generally requires on-site evaporation ponds to reduce the volume prior to hauling. If brine cannot be disposed of through an export pipeline, it would need to be hauled to a disposal site such as Kettleman Hills in southern California.

As with any treatment process, RO will also require disposal of sludge. Currently, sludge that exceeds 50 percent solids can be accepted at certain landfill facilities. The Alameda County Sludge Advisory Committee is developing a long-term plan for regional sludge disposal.

Any rural development proposals that will rely on septic systems will need to take into account Zone 7 WMP and RWQCB Basin Plan policies. These policies generally prohibit commercial and industrial development in the groundwater basin that will rely on septic systems, unless it is the equivalent of a rural residence. The policies also will limit new rural residential development to five acre or larger lots. Clusters of five or more rural residences in the groundwater basin will require special studies and management plans prior to approval.

## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Encouraging TWA to complete, in an expedient manner, a viable export system for urban wastewater*
- *Promoting the allocation of sewage export capacity by TWA to member agencies in a manner that will further the goals of this Plan*
- *Requiring that large-scale urban development utilizing TWA facilities incorporate appropriate equalization basins for storage of untreated wastewater during wet weather periods*
- *Encouraging development of water reclamation facilities, where feasible, in order to reduce wastewater export and provide additional water to help meet the growing needs of the East County*
- *Promotion of reverse osmosis wastewater treatment plants in appropriate locations, especially if it will further other County goals (such as encouraging agriculture)*
- *Prohibition of new rural residential development utilizing septic tanks over the groundwater basin with lot sizes less than five acres in size (if clusters of five or more rural residences are proposed for areas of less than 100 acres, special hydrologic studies may be required)*

- *Support of Zone 7's policy regarding commercial and industrial development on septic tanks*
- *Operation and maintenance of all new discrete, or package, treatment plants by a County agency; identification of sufficient funds for long-term operation and maintenance*



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## **Parks and Recreation**

### **■ INTRODUCTION**

Two regional park districts currently exist within the East County planning area (see Figure 21). The majority of the area is administered by the East Bay Regional Park District (EBRPD), while the easternmost section falls under the jurisdiction of the Livermore Area Recreation and Park District (LARPD). Changes to these boundaries--and the respective responsibilities of EBRPD and LARPD--are planned in the near future. LARPD administers land both within the Livermore city limits and beyond the incorporated area; the City of Livermore owns and operates several of its own smaller parks and facilities, including Centennial Park, Hansen Park, Doolan Park, Lincoln Park, the Civic Center and Quezaltenango Parkway. Parks within the cities of Dublin and Pleasanton are entirely under the jurisdiction of their respective municipal governments; as such, they are only discussed here in brief.

### **■ EXISTING CONDITIONS**

The physical setting for parks and recreation in the planning area is summarized in Figure 22. Additional information on the area's parks and recreation resources can be found below.

#### **East Bay Regional Park District**

East Bay Regional Park District (EBRPD) is funded through property taxes and bond measures, and provides regional park facilities in the western portion of the planning area. These include the following: Del Valle Regional Park (4,500 acres owned by the California Department of Parks and Recreation and managed by EBRPD); Ohlone Regional Wilderness (6,758 acres); Pleasanton Ridge Regional Park (1,771 acres, a small portion of which is west of the planning area); Shadow Cliffs Regional Recreation Area (249 acres); Sunol Regional Wilderness (5,924 acres); and Tassajara Creek Regional Park (451 acres). EBRPD also operates the Ohlone Wilderness Trail, which begins west of the planning area near Fremont, and extends 29 miles through Sunol, Ohlone and Del Valle Regional Parks (a proposed LARPD trail would eventually connect from this trail to Shadow Cliffs Regional Recreation Area via Sycamore Grove Park and the Arroyo del Valle.)

EBRPD, in its 1989 Master Plan, designated two sites within the Plan Area for possible acquisition in the future: Devaney Canyon and Vargas Road Plateau. In addition, the District has identified several possible trail routes which would run through the plan area. One would run between Del Valle Regional Park and Shadow Cliffs, following the course of Arroyo Del Valle (this trail would connect with an adjacent segment planned by LARPD).

### **Livermore Area Recreation and Park District**

The Livermore Area Recreation and Park District (LARPD) encompasses 245 square miles of eastern Alameda County, encompassing the majority of Murray Township. The area includes the City of Livermore and extends to the Contra Costa line in the north, the San Joaquin line in the east, and the Santa Clara line in the south; LARPD's holdings west of the Livermore city limits are minimal. LARPD's jurisdiction does not include the far northeastern corner of Alameda County; its boundary in this area corresponds with the line delineating the border between the Livermore Valley Joint Unified School District and the Mountain House Elementary School District.

The LARPD owns and operates a variety of parks and facilities, which are delineated in greater detail below. The District also develops, maintains and operates, through joint powers agreements, land and facilities owned by the City of Livermore and Alameda County. In addition, the District maintains an agreement with the Livermore Valley Joint Unified School District (many LARPD parks and facilities are located adjacent to school property). LARPD and the school district maintain a cooperative effort, meeting regularly and co-sponsoring many programs at each others facilities. The District is primarily funded by property taxes and developer fees.

The six types of park and recreation facilities administered by the LARPD Master Plan are summarized below (the standards used to define each park type are prescribed by LARPD; other districts may use other definitions). Although many of these facilities exist within the Livermore city limits, a number are not.

Neighborhood Parks. Neighborhood parks are generally 6-10 acres in size, serve three to five thousand people, and are used for informal, impromptu recreation. There are presently 20 neighborhood parks.

Community Parks. Community parks are a minimum of 30 acres, and are intended to be full-service recreation facilities. At the present time, the District only has one park (Robert Livermore) devoted exclusively to community use.

Regional Parks. 364-acre Sycamore Grove Park is the only park administered by the District where the primary use is regionally-oriented. Two other facilities (Robertson and Veteran's



Park) are designated, like Sycamore Grove, as regional/special use areas, but their emphasis is more on the latter.

Special Use Facilities. The 13 existing special use facilities (e.g., senior centers, athletic complexes, equestrian centers) respond to special recreation needs of the community.

Trail and Bikeway System. The LARPD Trail Master Plan, adopted in 1991, establishes an interconnected trail and bicycle route system in the District. A number of these trails/routes are intended to connect to the EBRPD regional trail system and the future "Chain-of-Lakes" area managed by Zone 7 of the Alameda County Flood Control and Water Conservation District. In general, planned trails which affect the Plan Area follow the arroyos, existing rural streets, and the South Bay Aqueduct.

In addition, the following projects have been planned or proposed by LARPD in its 1989 Master Plan:

Sycamore Grove Park Expansion. The District has identified properties on either side of the Sycamore Grove Park for future acquisition so that the existing park can be expanded.

Ravenswood. The District intends to further its role in preserving the Valley's agricultural history by assisting Friends of the Vineyards in the planning for a wine museum at the Ravenswood site. The District also proposes to establish an historic building "receiver park" on land adjacent to Ravenswood when it becomes available.

Chain-of-Lakes. The District lists a candidate project in the future Chain-of-Lakes area: an active water-oriented park centered around the one lake which would be located within LARPD jurisdiction. (Chain-of-Lakes is a major component of the *Specific Plan for Livermore-Amador Valley Area Reclamation*; it will consist of a series of connected lakes, which will be dedicated to Zone 7 for water conservation, water transmission, groundwater recharge, flood control and water quality management. The Specific Plan provides that the water areas may be also used for "recreation, fish farming, and other productive uses" to the extent they are compatible with the aforementioned uses.)

Trails. The LARPD Trail Master Plan shows proposed trails along the South Bay Aqueduct, the Arroyo del Valle, and a number of streets in the Plan Area including East Vineyard Avenue.

#### **LARPD/EBRPD Joint Agreement**

An agreement has been reached between LARPD and EBRPD (and approved by LAFCO) under which the two agencies will jointly plan for regional facilities in the area currently

under LARPD jurisdiction Murray Township; EBRPD will be solely responsible for acquiring and operating these areas. LARPD will still be responsible for parks and recreation facilities at the neighborhood and community levels, and will continue to operate Sycamore Grove. In addition, LARPD will continue to pursue acquisition of the regionally-oriented Brushy Peak area, although EBRPD may eventually be brought in to operate the area. The existing LARPD Master Plan and Master Trails Plan will continue to be the guiding document for regional parks in Murray Township until EBRPD undertakes its regular Master Plan review (tentatively scheduled for 1994).

One of the primary motivating factors behind the LARPD/EBRPD agreement is the expectation that EBRPD is in a better position than LARPD to acquire open space areas; if approved, the agreement should result in a long-term increase in the amount of regional parkland in Murray Township. The agreement would not result in any tax increase for Murray Township residents; tax revenues would be gradually shifted from LARPD to EBRPD over the next ten years so that the latter is receiving the same amount per parcel as it does elsewhere in Alameda County.

It should also be noted that EBRPD also is annexing the northeastern corner of the planning area--specifically, that section outside of the LARPD boundary which corresponds to the Mountain House School District. This area is currently unserved by any park district, and no portion of its tax revenues are assigned to this purpose; while EBRPD'S plan is to assume authority over this area in a regional capacity, its residents would continue to receive the same tax treatment. LARPD's boundary would not be extended to include this portion of the County.

### **City of Dublin**

The Dublin/San Ramon Services District provides services within the City of Dublin, operating one community park, one neighborhood park, and two special use facilities. Additionally, three small neighborhood parks adjoin schools. Of significance to the planning area is a north-south trail link proposed by the city which would follow the West Dublin ridgeline and connect with a regional trail network projected by EBRPD.

### **City of Livermore**

In addition to the LARPD facilities noted above, the City of Livermore operates several small parks totalling less than ten acres.

### **City of Pleasanton**

The City of Pleasanton provides park and recreation services within its city limits. The city operates two community/district parks totalling 335 acres, nineteen neighborhood parks totalling 117 acres, and four undeveloped park sites totalling 25 acres. The only issue of direct relevance to the planning area involves the East Vineyard Avenue transitional area, which presently falls under the jurisdiction of East Bay Regional Park District. Pleasanton plans to annex this area, however, after which park and recreational services at the local/community level would be provided by the city rather than EBRPD.

### **Alameda County Flood Control and Water Conservation District (Zone 7)**

Zone 7 of Alameda County's Flood Control and Water Conservation District serves the majority of the planning area. In 1985, Zone 7 adopted the "Arroyo Management Plan" which provides for public recreational access along the flood channels and arroyos under its control. The plan aims to meet flood control and water control priorities while at the same time establishing an open space system suitable for uses such as walking, hiking, jogging, bicycling, horseback riding, picnicking, nature study, etc. The Trail Master Plan includes existing, future and potential trails along the following: Arroyo Mocho, Arroyo De La Laguna, Arroyo Del Valle, Arroyo Las Positas, Alamo Canal, Stanley Boulevard, Tesla Road, and the Southern Pacific Railroad. Zone 7 acts as coordinating agency for the plan, but allocates responsibility for its implementation to EBRPD and LARPD.

### **State of California**

The state owns and operates two parks in the far eastern portion of the planning area: Bethany Reservoir State Recreation Area (312 acres), in the Mountain House area; and Carnegie Motorcycle State Park (1600 acres), near Tesla Road.

## **■ TRENDS**

### **Acquisition of Regional Parkland**

One of the most notable, and positive, trends affecting the planning area has been the continued accumulation of regional parkland for public use. EBRPD has played the dominant role in this respect, acquiring large tracts of open space for primarily passive uses. While LARPD also serves as a regional park district, its priorities have traditionally focused more on providing active-use facilities for the urbanized areas under its jurisdiction. Official LARPD policy is to actively acquire land, but only as it becomes available or offered. While LARPD currently maintains only one regional park, its 1989 Master Plan notes an



"increased emphasis on open space, natural resource protection and trail use," and states that the District "looks forward to an increasingly prominent role in providing regional parks." Among the areas it identifies for possible acquisition are Brushy Peak, Cedar Mountain, and Duarte Canyon.

### **Growth in Recreation Demand/Change in Recreation Patterns**

Population growth and changing recreation patterns over the past decade have contributed to a substantial increase in recreation demand within the planning area. Increasing public concern about health and fitness has led not only to greater recreation demand, but to demand for a wider range of recreational activities (e.g., mountain biking, hang gliding). The location and timing of recreational activities also appears to be shifting somewhat. Traditionally, weekday recreation has taken place in or near neighborhood parks in residential neighborhoods. Increasingly, however, recreation activities are occurring at or near the workplace, in areas where recreational or pedestrian facilities may not exist. The need to accommodate new activities and new recreation patterns has, in turn, added to the complexities of planning and managing parks in the planning area.

## **■ PLANNING ISSUES**

### **Growth Impacts**

The General Plans for Dublin, Livermore and Pleasanton all provide for significant population growth, both within their current corporate limits and in their respective spheres of influence. This growth would increase demand for park and recreation facilities, straining or exceeding the service capacity of existing facilities. Proposed development could also, in certain instances, conflict with planned park and recreation district facilities (e.g., potential development in the Vineyard Area could conflict with LARPD plans for expansion of Sycamore Grove Park, and with plans for an historic receiver site south of Ravenswood). Future development in rural areas could also conflict with proposed trails under the LARPD and EBRPD Trail Master Plan.

In light of the projected population growth noted above, LARPD anticipates that an additional 100 acres of neighborhood parks, equitably distributed in new neighborhoods, will be needed by the year 2010 to maintain the established standard of 2 acres per 1,000 people. Two more community parks will be needed in the "near future", and another three by the year 2010. Approximately 100 acres of new special use facilities will be needed by the year 2010 to meet the established standard of 3 acres per 1,000 people. EBRPD's Master Plan does not identify any comparable need for increased facilities--a function, in all probability,

of its exclusively regional focus, which affords the District more flexibility in responding to population growth.

### **Financing of Parkland Acquisition/Expansion**

Beginning on September 2, 1992, a new Alameda County park dedication ordinance (as authorized under the Quimby Act) will take effect which applies countywide. The new ordinance, like the old one, requires the dedication of land or payment of an in-lieu fee for all residential tracts (subdivisions of five or more units). The new ordinance, adopted by the Board of Supervisors on June 3, 1992, makes minor changes in the amount of land required for dedications and significantly increases the amount of the in-lieu fee; these changes will boost County requirements to a level comparable to that of cities in the planning area.

The new requirements pertain to all new residential construction and apply to both to acquisition and improvement of parkland. In allocating the revenue from these fees, the East County is divided into three benefit areas. Funds from development near Livermore go to LARPD; similarly, funds from development near Pleasanton go to the City of Pleasanton, and those from the Dublin area go to the City of Dublin.

Property taxes provide another source of financing for regional parks in the planning area: a portion of the property taxes paid by new East County residents go to the operation, maintenance, and financing of EBRPD or LARPD projects. As noted above, taxes from Murray Township residents may eventually be allocated to both EBRPD *and* LARPD.

### **Potential Land Use Conflicts**

Expansion or improvement of the County's park and recreation resources may conflict with other proposed land uses (commercial or residential development, for example, or extraction of mineral resources). Guidelines for minimizing incompatibility between land uses should be established to facilitate resolution of such conflicts, and currently unprotected areas which warrant permanent preservation as open space/parkland should be identified and zoned as such.

## **■ POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- o Coordination with Alameda County Specific Plans currently in effect, as well as EBRPD and LARPD Master Plans, the Arroyo Management Plan, and General/Specific Plans for Dublin, Livermore and Pleasanton*
- o Expansion of the existing regional park system according to standards in the County Recreation Element and EBRPD/LARPD Master Plans*
- o Assurance that urban development projects pay appropriate development fees and/or land dedicate land for park and recreation services/facilities*
- o Prevention of conflict between development projects and proposed or existing LARPD/EBRPD trails*
- o Coordination of policies to accommodate the transfer of regional park authority from LARPD to EBRPD*
- o Establishment of guidelines to minimize incompatibility between land uses.*
- o Identification of currently unprotected areas which warrant permanent preservation as open space*



## **SOURCES**

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## Schools

### ■ INTRODUCTION

The planning area is divided into five school districts (see Figure 23 for boundaries): the Livermore Valley Joint Unified School District, the Pleasanton Unified School District, the Dublin Unified School District, the Sunol Glen School District, and the Mountain House Elementary School District (the latter two operate primary schools only, relying on other school districts to provide education at the secondary level). The boundaries of these districts do not follow city limits, and are administered and funded separately from municipal entities in the planning area.

### ■ EXISTING CONDITIONS

#### School Districts

Livermore Valley Joint Unified School District (LVJUSD). The LVJUSD serves the following areas: the City of Livermore; most of the unincorporated area in the eastern half of the planning area (with the exception of the northeast corner); and a portion of unincorporated Contra Costa County. The District currently has nine elementary schools, three middle schools, one combination elementary and middle school, two high schools, and two continuation high schools.

Pleasanton Unified School District (PUSD). The PUSD provides primary and secondary school education to the City of Pleasanton and surrounding unincorporated areas. The District administers seven elementary schools, two middle schools and three high schools.

Dublin Unified School District (DUSD). The DUSD provides primary and secondary school education to the City of Dublin and the adjacent unincorporated area. The District operates three elementary schools, one middle school and two high schools.

Sunol Glen School District (SGSD). The SGSD serves the Sunol area and the southeastern portion of the planning area. The District administers one primary school, with the PUSD providing secondary school education for the area.

Mountain House Elementary School District (MHESD). The MHESD, which consists of one primary school, is located in the extreme northeastern corner of the planning area. The Tracy Joint Union High School District provides secondary education for this area.



## School Funding Sources

Prior to the passage of Proposition 13 in 1978, California schools had traditionally relied upon property taxes as a major revenue source. Proposition 13 significantly reduced this source of local income, making school districts more dependent upon state funding. Impact fee legislation passed in the early 1980s to fund interim school facilities provided some relief, but required the cooperation of affected cities and counties in levying a fee. The 1984 California State Lottery Act provided schools with a new income source, but lottery revenue is only available to meet a small percentage of school funding needs, and cannot be used for capital improvements such as the construction of school buildings.

State funding for school facilities still exists through the Leroy F. Greene State School Building Lease-Purchase Law of 1976, but there are several major drawbacks to this program: 1) conditions of overcrowding must exist or be extremely imminent before a district can qualify; 2) the process is very slow owing to red tape and bureaucracy; and 3) available funds are insufficient to meet school construction needs throughout the state.

Indeed, similar problems plague all sources of state financing for new school facilities, thanks to limited funds and vigorous competition among school districts. This funding squeeze has prompted school districts to employ alternative methods for funding new construction. The following methods give school districts some measure of local control over financing, with development fees being the most commonly used approach.

Development Fees. The authority of school districts to impose development fees derives from Section 53080 of the Government Code, and dates back to the passage of AB 2926 in 1986. AB 2926 authorizes school districts to levy development fees to pay for new school construction. The maximum fees that can be collected under this authority are \$1.65/square foot for residential development, and \$0.26/square foot for commercial and industrial space; these figures can be adjusted upward to compensate for inflation.

Soon after the passage of AB 2926, problems began to arise in its administration. Most notable was the claim that some school districts were levying fees without establishing a clear connection between new development and the need for new schools. This concern was addressed in 1987 by AB 1600, which established nexus requirements for school district impact fees. Other problems which had arisen in the implementation of AB 2926 were addressed in 1989 with the passage of AB 181, which clarified and modified the terms under which schools could impose fees, charges or dedications upon new development.

It should be noted that the impact fees authorized under AB 2926 are usually considered insufficient to cover the cost of new school facilities associated with new development; school districts generally find that such fees supply less than half of the needed revenue, and

some estimates place the figure in growth areas as low as 15 to 25 percent. In light of this fact, some districts have negotiated impact fees which are significantly higher than the state maximum (this figure is, technically, the maximum a district can *require* a developer to pay, but it does not prevent the negotiation of higher fees based on CEQA impacts).

Mello-Roos Act. The Mello-Roos Community Facilities District Act allows financing districts to be established to fund school construction. The owners of land within the boundaries of a Mello-Roos Community Facilities District (CFD) are assessed a special tax to finance specific improvements within that district. Mello-Roos taxes must be approved by two-thirds of the voters within the proposed CFD or, when the district has fewer than 12 property owners, by majority vote of the owners. Proceeds from Mello-Roos taxes can be used to directly fund improvements such as new schools and, if bonds have been issued, to pay service on those bonds.

One advantage of the Mello-Roos Act over other types of funding is that it allows the establishment of a financing district that does not include all the land within the boundaries of the school district. This means that newly-developing areas, where demand for additional school facilities is greatest, can be isolated from those parts of the district in which facilities are adequate or demand is otherwise low. Another advantage associated with Mello-Roos funding is that it provides up-front money to build needed facilities. Chief among its disadvantages is that it adds to the annual tax burden of homeowners.

General Obligation Bonds. As a result of the passage of Proposition 46 in 1986, cities, counties and school districts are again empowered--subject to voter approval--to issue general obligation (G.O.) bonds to finance land acquisition and capital improvements. G.O. bonds are repaid with the revenues from increased property taxes (authorized by local voters as part of the G.O. bond measure). Approval by two-thirds of the voters within the school district is required for passage of such a bond measure--a percentage which is often difficult to achieve, particularly in the current economic climate. However, G.O. bonds tend to be the least expensive type of public financing, and require very little administrative burden for the local agency once they have been sold.

Certificates of Participation. Certificates of participation (COPs) are a form of lease financing; they are similar to bonds in many ways, but do not require voter approval since they are technically leases. COPs can be used for the construction of school facilities, but items financed in this manner should be carefully chosen: the capitalized interest period can be long and costly, and the lease period cannot exceed the useful life of the item financed.

Special Taxes. School districts may impose special taxes in the same manner as counties and cities, provided that the tax applies uniformly to all taxpayers or all real property within the district (exception: taxpayers who are 65 or older can be exempted from this provision).



These special taxes (also known as "parcel taxes") may only be imposed when two-thirds of the school district's voters approve the school board's specific proposal for such a tax. As with G.O. bonds, it has become increasingly difficult in recent years to obtain passage of such measures.

Redevelopment Agencies. Cities and counties sometimes create redevelopment agencies to help fund improvements in blighted areas. If a school district can show that the redevelopment area is impacting the district, it may be able to negotiate a share of the revenue generated by the redevelopment agency. Redevelopment agencies usually create revenue through tax increment financing; such revenue cannot be used for regular maintenance and operation costs, but can be used for capital expenditures (building schools, purchasing equipment, etc.)

Asset Management. The term "asset management" is often applied to enterprises which involve the sale or lease of surplus school sites. Other options also fall under this rubric, such as shared sites/facilities, joint use with other agencies, or programs which do not involve surplus school sites at all. Asset management can be a source of pay-as-you-go funds, or used for debt service.

### **Recent Legislative Developments**

Senate Bill (SB) 1287, which significantly modifies the funding situation for school facilities, became law in September 1992. The general intent of the bill is to limit the state role in financing school districts, placing primary responsibility on the school districts themselves, and expanding their capacity to raise needed funds locally. The legislation is divided into several distinct sections, all of which hinge on whether Assembly Constitution Amendment 6 (ACA 6) is approved by voters. ACA 6 is a ballot measure which would set a majority vote requirement for bonded indebtedness for the construction, reconstruction, or rehabilitation of school facilities; since current law mandates approval by two-thirds of the voting public, ACA 6 would make it easier to obtain local funding for school facilities. ACA 6 will be on the ballot in June 1994.

The main provisions of SB 1287 are outlined below:

- If ACA 6 passes, the Leroy F. Greene Act of 1976 will be repealed as of January 1, 1996.
- Beginning January 1, 1993, school districts will be allowed to levy increased school financing fees on certain residential construction (an additional \$1 per square foot over the current \$1.65 limit). This provision will be repealed if ACA 6 is approved.



- Beginning January 1, 1993, public agencies will be prohibited from denying the approval of a project pursuant to planning and zoning law based on the adequacy of school facilities, or from imposing conditions on the approval of a project for the purposes of providing school facilities in excess of the amounts noted above. This provision will also be repealed if ACA 6 is approved.

The last provision noted is an outgrowth of the 1988 ruling by the Fourth District Court of Appeal in *Mira Development Corporation v. City of San Diego*. In that case, the Court found that the City of San Diego could deny a request for rezoning if the resulting development would exceed the available public services and improvements in the area (including school facilities). While the Court refused to restrict local governments' authority over zoning decisions or other "legislative powers"--a decision upheld in two subsequent cases--SB 1287 would effectively reverse the effect of these decisions; local governments would cease to have any recourse in mitigating school impacts aside from use of the higher school facilities fee.

If ACA 6 is successful, resulting in repeal of this provision, current law would be reenacted and the effect of the *Mira* decision would be reestablished. The authority of public agencies to mitigate school impacts would be restored to its current scope, but there would also be negative implications for school district financing: removal of the \$1/square foot increase in the school fee cap, and repeal of the Leroy F. Greene School Building Lease-Purchase Act of 1976.

## ■ TRENDS

### Changing Enrollment Patterns

Declining enrollment in the 1970s, resulting from a substantial decrease in family size, led to the closure of some schools in the planning area. A combination of in-migration and rising birth rates has subsequently reversed this trend; school districts in the area now anticipate the need for new facilities to accommodate projected population growth. The practical implications of this trend for each school district are summarized below:

Livermore Valley Joint Unified School District. Total enrollment at LVJUSD schools is currently at 87 percent of total capacity. According to the District, students that will be generated under existing housing permit allocations in the City of Livermore will more than absorb this existing capacity. According to the City's 20-year plan, an additional four elementary schools, two middle schools, and one high school will be needed to serve the projected population.

Pleasanton Unified School District. Total enrollment at PUSD schools is presently at 79 percent of total capacity. The PUSD projects that student populations will grow approximately three to five percent annually during the next five years. Crowding is expected in the middle schools, despite recent grade and attendance reorganization. New schools and expansion plans are underway to accommodate increasing population in the PUSD: a new middle school is near completion, a new elementary school will be built within the next two years, and there are plans to expand two elementary schools and two high schools. The District anticipates that there may also be a need for an additional middle school within the next four years.

Dublin Unified School District. Although the DUSD is not currently expanding, planning proposals for the East Dublin area would require the construction of a new high school as well as additional elementary and intermediate schools.

Sunol Glen School District. The SGSD recently purchased two new classrooms to ease overcrowding at Sunol Glen Elementary. A bond measure to fund expansion of the school was on the ballot in June 1992, but did not pass.

Mountain House Elementary School District. The MHESD, with a total enrollment of 39 students, is operating well below its capacity. There are no plans to expand facilities in the foreseeable future.

## ■ PLANNING ISSUES

School districts will be under substantial pressure in the future to provide adequate facilities to serve the growing population of the planning area. Financing of new school facilities will present the most formidable challenge to school districts in the planning area; the construction of these facilities will need to be timed with new development to ensure that adequate school capacity is available when needed. Once a district has determined that new schools are needed, the location and siting of the new facilities must be approved by both the district and the State Department of Education.

One factor to be considered in planning new school facilities is the location of development relative to school sites. Scattered rural development is generally more difficult to serve than concentrated, city-based development, due to: a) the cost of transporting the rural student population to urban school locations; or b) the higher per capita cost if smaller facilities are used to serve the rural areas. School location is also a factor in efforts to maximize efficiency and open space; to this end, planning for new schools should be coordinated with plans for facilities relating to child care and parks and recreation.

The difficulties inherent in funding new school facilities may also prompt alternative solutions, such as the institution of year-round class schedules, or the addition of portable classrooms to existing campuses.

### ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- o Provision of adequate sites, in locations which will optimally serve planned growth, for elementary, middle and high schools in unincorporated locations within the East County*
- o Assurance, to the extent possible, that funding to ensure the timely development of schools is in place prior to approving applications for residential growth*
- o Assurance, to the extent possible, that school facilities are adequate prior to approving applications for residential growth*
- o Encouragement of efficient, multi-purpose use of school facilities (such as recreation or child care)*
- o Development of school facilities in conjunction with and adjacent to parks and trailways*
- o Support of special school funding mechanisms (local fees, special taxes, bond issues, etc.)*



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## **Child Care**

### **■ INTRODUCTION**

In this report, child care refers to any care provided to children of all ages on a planned, regular basis during the portion of the day that children are not with their parents or in school. Like schools and health care, child care is an integral part of the East County infrastructure. Thus, it is an essential element in planning for development in the East County.

### **■ EXISTING CONDITIONS**

#### **Regulatory Setting**

Child care may occur in one of two general forms. It can be a formal arrangement that takes place in facilities licensed by the state or it can be an informal, private arrangement that does not require licensing. Informal child care arrangements typically take place in the child's home or in the home of a neighbor, relative, friend, or babysitter. Formal child care arrangements licensed by the state can take place in family day care homes or child care centers.

Family Day Care Homes. Licensed family day care homes allow care of up to 12 children, including the child care provider's children, in the provider's home. (A provider is the person in a child care facility responsible for the welfare of a child during the absence of the parent or guardian.) Providers caring for only one family other than their own are exempt from licensing. Family day care homes can either be small, allowing up to six children, or large, allowing seven to 12 children. In small family day care homes, three of the six children may be under two years of age. Under state law, small family day care homes are a permitted use in all residential zones.

In large family day care homes, a maximum of four of the 12 children may be under two years old. The provider must have the assistance of one adult. In the East County, large family day care homes are required to have use permits from the Cities of Livermore, Pleasanton and Dublin or, in the unincorporated areas, from Alameda County. The person applying for the day care home or another person that might be affected by the home may request a public hearing to allow public support of and opposition to the home. To assist family day care providers through the permit process, Resources for Family Development, (RFD) a not-for-profit resource and referral agency that advocates quality child care and consults with government and business, distributes information about permit requirements for the Cities of Livermore, Pleasanton, and Dublin. RFD does not presently provide Alameda County permit requirements for day care homes in unincorporated areas.

Child Care Centers. Child care centers provide care in a group setting such as a church, school, community center or other building designed or renovated for child care. This can include infant centers, preschools, nursery schools and extended day care (such as after school) facilities. Centers are licensed by the state unless specifically exempt from licensure. Child care centers may be operated by public agencies such as school districts or cities, by non-profit organizations, or as for-profit businesses.

## Supply

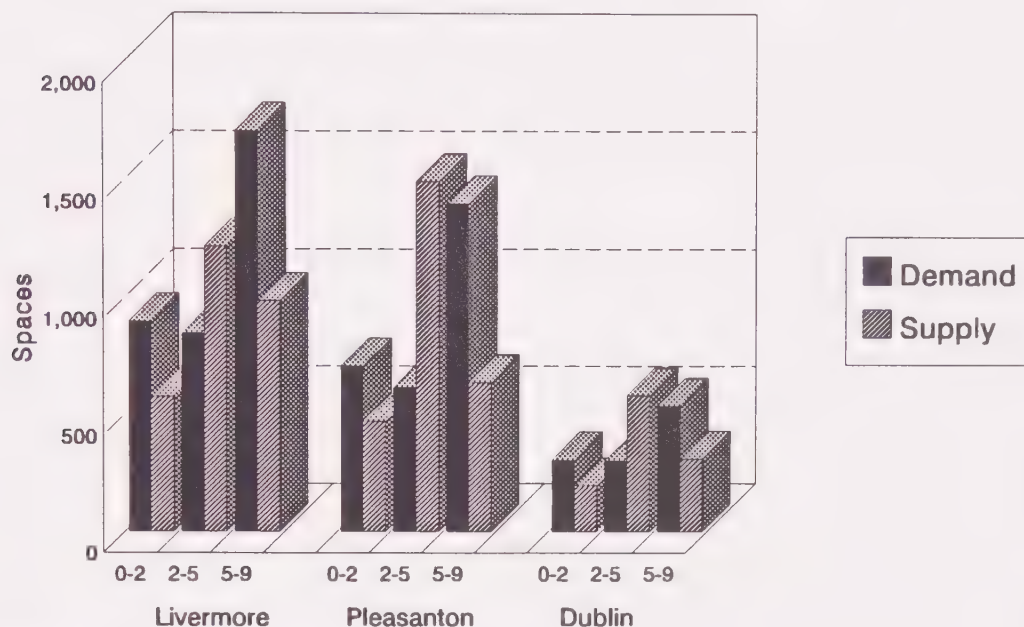
The most recent information on child care supply and demand in the East County is derived from Resources for Family Development (RFD, 1991). Licensed family day care homes have the capacity to care for 2,868 children and licensed child care centers have the capacity to care for 3,233 children in Livermore, Pleasanton and Dublin. The greatest number of licensed child care arrangements in these three cities is available for pre-schoolers (two to five years of age) with the least available for infants (up to two years of age). For further information, see graphic titled, "Child Care Demand and Supply by Age".

The State Assembly Office of Research estimates that half of all working mothers have children that need child care. According to RFD, the supply of child care for before and after school falls short of meeting the need in Livermore, Pleasanton and Dublin by 1,711 spaces. The supply of child care for infants falls short of meeting the need by 625 spaces. For preschoolers, supply exceeds demand in all three cities. This data is summarized in Figure 2. The number of unlicensed child care providers, either informal arrangements or family day care homes and centers operating illegally without a required license in the East County is unknown.

Resources for Family Development (RFD) reports that they received requests for child care referrals for 3,075 children from July 1991 to June 1992 (Leonard, 1992). Nearly three quarters of their requests for child care referrals are for children under five years old, and slightly more than half of those requests are for children under two years of age. The majority of families request child care referrals because the parents are employed. Most families request full or part-time care on a regular basis and a small portion (two percent) request night and week-end care. The majority of referral requests at RFD are for licensed family day care homes and centers with less than five percent of their requests for nanny services. In addition to RFD, families seek child care for an unknown number of children through informal routes such as advertising and word of mouth.



## CHILD CARE DEMAND AND SUPPLY BY AGE



Source: Resources for Family Development, 1991.

TABLE D-9			
Unmet Need For Before and After School Care By City			
	Demand <sup>1</sup>	Supply <sup>2</sup>	Gap
Pleasanton	1,418	658	760
Livermore	1,720	976	744
Dublin	541	334	207
Note: <sup>1</sup> Demand was calculated based on a 1985 Assembly Office of Research estimate that 50 percent of working mothers need child care. <sup>2</sup> Supply includes homes and centers.			
Source: Resources for Family Development, 1991.			

## **Children with Special Needs**

Children that need child care may also have more specialized needs. Those with special needs include children with disabilities or health needs, limited English speaking families, teen parents, homeless, and abused children. Three examples of child care arrangements that can meet these needs are: 1) providing specially trained providers for children with disabilities; 2) providing care near the schools teen parents are attending to encourage them to complete school; and 3) providing a small group setting and the opportunity for close interaction between child care providers and the parents of abused children.

Children with Health Needs. As an indication of the number of children with special health needs, the County Health Care Service Agency recorded that 4,184 County residents under age 21 with medical conditions received financial assistance and medical services from the Agency between July and December 1991 (Alameda County Health Care Services Agency, 1992). The Health Care Services Agency does not further break down the number of residents served by age groups. During the same period, an additional 2,394 under 21 years of age who had medical conditions and were referred to the Health Services Agency were not accepted into the program. Between 1985 and 1990, the State Department of Health Services recorded 187 births of children with congenital anomalies in the East County, or 8.8 percent of such births countywide.

Children with Limited English Proficiency. According to the County Office of Education, 623 Limited English Proficient (LEP) students were enrolled in the East County School Districts: Dublin Joint Unified, Livermore Valley Joint Unified, Mountain House Elementary, Pleasanton Unified and Sunol Glen Unified (Jacome, 1992). The East County accounts for 3.5 percent of the County's LEP students.

Children of Teen Parents. In 1990, the County Department of Health recorded 83 births by mothers 14 to 18 years of age in the Pleasanton and Livermore areas (Alameda County Department of Health, 1991). This amounted to 3.8 percent of the total births in these areas. The East County accounts for 5.8 percent of teen mothers in the county.

Homeless Children. In a 1989 survey of people using homeless shelters in Alameda County, the Emergency Services Network reported that 28 percent of shelter residents were 12 years of age or less and 31 percent were under 18 years of age (Emergency Services Network, 1990). Nearly half (45 percent) of adult residents were women with children and a total of less than 10 percent of household types in the shelters were comprised of couples with children, pregnant minors or minors with children, and single men with children. The two shelters in the East County serve approximately 150 children per year. (Meir, Bateson, 1992). Many homeless people in the East County live in their cars, and are therefore not reflected in shelter resident surveys (Street, 1992.) This population is eligible for child care subsidies or entitlement programs, which are discussed under "Affordability", below.

Abused Children. The State Department of Social Services recorded 17,160 inquiries and reported cases of child abuse in Alameda County in 1991 (Hayes, 1991). During the same period, the State Department of Justice investigated 1,196 cases in the county. The number of

investigated cases reflects the number of perpetrators investigated, rather than the number of abused children.

### Affordability

In 1991, the average cost of child care in Livermore, Pleasanton, and Dublin ranged from \$63 per week for school-age children (5-9 years old) in a family day care home to \$143 per week for infants in a day care center (RFD, 1991); this information is summarized in Figure 3. Child care costs are higher for infants than for older children because of the State requirement to provide a higher provider-to-child ratio for infants than for older children.

TABLE D-10

#### Average Weekly Cost of Care by Age and City

City	Homes			Centers		
	Cost 0-2	Cost 2-5	Cost 5-9	Cost 0-2	Cost 2-5	Cost 5-9
Livermore	\$ 99.41	\$ 90.97	\$ 61.36	\$133.66	\$ 91.76	\$ 56.04
Pleasanton	110.86	101.98	63.80	158.93	104.60	68.62
Dublin	102.40	95.53	64.50	138.00	101.74	79.06
Average	\$104.22	\$ 96.16	\$ 63.22	\$143.53	\$ 99.37	\$ 67.91

Source: Resources for Family Development, 1991.

Child care subsidies are available through several programs funded or administered at the federal, state and county levels, or administered through Resources for Family Development. These programs are the California Department of Education (CDE), Greater Avenues for Independence (GAIN), Transitional Child Care (TCC), Federal Child Care Block Grant, and Job Training Partnership Act. In the East County, upwards of 800 people requesting subsidies through Resources for Family Development are unable to receive them due to insufficient funds (Leonard, 1992). A brief description of each subsidy program follows.

California Department of Education (CDE). The CDE provides subsidized slots for children in licensed child care centers and funds for child care for eligible parents in the private sector by the parents' choice of child care. CDE serves families referred by the Children's Protective Services and those earning below 84 percent of the state median income. CDE focuses on serving children with parents who are working or attending training programs. Among CDE's programs are those for general child care, after-school care, care to handicapped children, short-term respite care for children at risk for abuse or neglect, care for children of teen parents attending school and for college student parents.



Greater Avenues for Independence (GAIN). GAIN provides a federal and state subsidy child care program. The funding is received by the County and administered through a contract with community resource agencies such as Resources for Family Development in the East County. Child care is paid while the parent is receiving Aid to Families with Dependent Children (AFDC) and attending a training program. Funding for child care generally does not exceed two years.

Transitional Child Care (TCC). TCC is a state and federally funded program that provides child care funding for up to one year after a working parent becomes independent of AFDC. This is the only child care program that is administered by the County rather than through a community resource agency.

Federal Child Care Block Grant. Federal Child Care Block Grant funds subsidize families who fall below 75 percent of the state median income and can demonstrate a need for child care services. Such a demonstration might include verification of the parent's employment or training. (The state monthly median income for a family of four is \$2,387 as of 1992.) The Block Grant has several programs, each of which has different requirements.

Job Training Partnership Act (JTPA). JTPA is funding that pays for child care while a low income parent is attending a training program approved by the Private Industry Council. RFD administers funds for the East County. To qualify for JTPA funds, a parent must be on AFDC. Through JTPA, child care is subsidized for one year but can be extended with approval.

Title IVA. Title IVA is a federally funded program, beginning in 1992, designed to prevent families from going on welfare. Low income working families earning below 84 percent of state median income and who are at risk of AFDC dependency are eligible. Under the program, families pay child care fees on a sliding scale and the state pays the difference. The program is administered by the California Department of Education.

Non GAIN Education and Training (NET). Non GAIN Education and Training is a program administered by Alameda County for AFDC recipients that are not eligible for GAIN and are in training. NET funds child care for eligible families.

## Quality

Quality of child care is determined by several factors. Teachers and providers need to have adequate salary and benefits to encourage them to stay in the field. Without such encouragement, teachers leave the field, resulting in a high staff turnover rate. This in turn leads to reduced stability for children and a low morale for those remaining in the field. New teachers do not have the cumulative expertise needed for quality care working with children.

In 1989, the average annual income for an experienced day care center teacher was \$14,800 (Child Care Employee Project 1989, cited in RFD, 1991). This salary is below Housing and Urban Development's "very low" income category for a one person household for the same year. Another child care teacher salary and benefit survey is being conducted by the Child Care Employee Project and should be available in late 1992. Less than one-quarter of center teachers

have full health coverage and none has a fully-paid pension plan. Center teachers leave the field in three years on the average.

The staff turnover rate in family day care homes (the number of new family day care providers compared to the number of providers that leave the business) has increased in Pleasanton and decreased in Livermore and Dublin between 1987 and 1991 (RFD, 1991).

Another factor that affects quality of child care is the availability of ongoing training of child care teachers. Child care center teachers are required to earn 12 college units in early childhood education and six months' teaching experience to receive their required license. Although family day care providers do not have the same requirement, they may choose to also take courses in early childhood education. Many classes in early childhood education that have been traditionally offered through community colleges (such as Chabot or Los Positas Colleges) are no longer being offered due to reduced state funding and subsequent budget cuts.

### **Accessibility**

Most people who use child care choose facilities that are close to their home, work, their children's school, or a transportation hub. Typically, after-school care is most often needed at or near the child's school because it is difficult for parents to leave work to transport their children from their school to a child care facility. Infants and pre-school children are most likely to need care near their homes, their parent's employment, or a transportation hub.

### **Employer Involvement**

Few employers in the East County take advantage of employee child care programs, such as the Dependent Care Assistance Program, which provides tax breaks to employers and their employees. Alameda County's Child Care and Work Family Information Program for Businesses is a technical assistance program providing free information to businesses throughout the county about employer supported child care. Through this program, Resources for Family Development is funded by the County to distribute materials and provide consultations and seminars to businesses in the East County.

## **■ TRENDS**

### **Shortage of Child Care Facilities**

The U.S. Census reported that the East County population for persons up to nine years of age increased 23.8 percent from 1980 to reach a total of 20,108 children by 1990 (U.S. Bureau of the Census, 1990); see Table D-11 for a comparison of 1980 and 1990 population by age group.) The rapid increase in population of newborns to two-year olds has led to a shortage of affordable infant care in the East County. When these infants become preschoolers, the supply of child care facilities for preschoolers may no longer be able to meet the demand for their care. The shortage of after-school care in the East County is due to the lack of an adequate number of

facilities at or near schools and a means of safely transporting children between schools and child care facilities.

### **Increased Child Care Costs**

Costs for child care in the East County increased from 7 to 17 percent between 1990 and 1991, depending on the type of facility and the age of the child (RFD, 1991). The combination of escalating costs, increase in unemployment, and high cost of housing in the East County led to a 17 percent reduction in the number of requests for child care referrals in the East County in the past year. Families that needed child care but were unable to afford it had to make alternative child care arrangements, such as having family or friends care for their children, or sending schoolchildren home alone.

### **High Staff Turnover Rate**

Since 1987, the staff turnover rate, or the rate at which child care providers are leaving the child care field, in family child care homes has ranged from 18 percent to 30 percent in Livermore, Pleasanton and Dublin. (See graphic titled, "Turnover in Family Child Care Homes" for further information.) RFD anticipates that the turnover rate may increase again in 1992 due to the increased vacancies in child care caused by the recession, which may urge providers to seek a more stable and lucrative income elsewhere. When providers leave the field, families often have to make abrupt, temporary child care arrangements that often do not work out over time and are disruptive to children.

By January 1995, 15 hours of pediatric cardiopulmonary resuscitation (CPR) will be required for child care teachers in homes and centers. This training is not readily available.



TABLE D-11

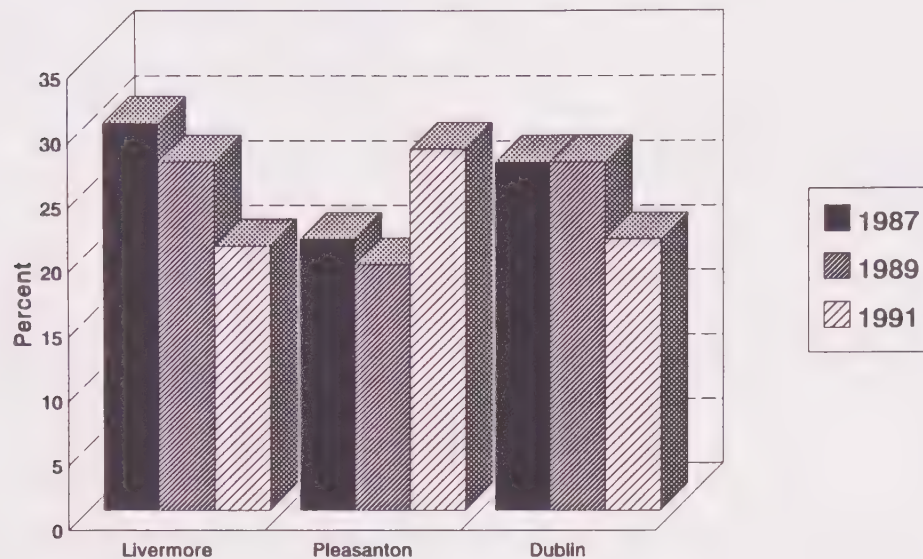
**Children In The East County By Age Group: Children 0-9 Years Old  
By Place East County Planning Area: April 1, 1990**

Location	0-2 yrs	3 & 4 yrs	5-9 yrs	Total
Dublin	1,019	677	1,516	3,212
Hayward	0	1	0	1
Livermore	2,908	1,870	4,434	9,212
Pleasanton	2,278	1,393	3,458	7,129
East County Uninc.	167	101	286	554
East County Total:	6,372	4,042	9,694	20,108
East County % of County Total	10.86%	10.85%	11.17%	11.01%
County Total:	58,666	37,266	86,780	182,712

**Children 0-9 years old by Place  
East County Planning Area: 1980 and 1990**

Location	0-4 years				5-9 years				Total			
			1980-1990				1980-1990				1980-1990	
	1980	1990	Change	% Change	1980	1990	Change	% Change	1980	1990	Change	% Change
Dublin	1,088	1,696	608	55.9%	1,206	1,516	310	25.7%	2,294	3,212	918	40.0%
Livermore	3,832	4,778	946	24.7%	4,225	4,434	209	4.9%	8,057	9,212	1,155	14.3%
Pleasanton	2,178	3,671	1493	68.5%	3,132	3,458	326	10.4%	5,310	7,129	1,819	34.3%
East County Unincorporated	257	268	11	4.3%	324	286	-38	-11.7%	581	554	-27	-4.6%
East County Total:	7,355	10,413	3,058	41.6%	8,887	9,694	807	9.1%	16,242	20,107	3,865	23.8%
County Total:	72,537	95,932	4,562	6.3%	70,721	86,780	1,095	1.5%	22,133	27,790	5,657	25.6%

## TURNOVER IN FAMILY CHILD CARE HOMES



Source: Resources for Family Development, 1991.

### PLANNING ISSUES

Residential, commercial and industrial development in the East County will bring with it the need for additional child care for new residents and workers with children. This will be added to existing conditions in which child care needs are not being met for infants and school-age children, and may be exacerbated as infants become pre-schoolers. A portion of children associated with new development will need subsidies, which will compete with existing children eligible for limited subsidies. Without the benefit of a convenient location, child care facilities do not offer viable alternatives to working parents and guardians. If the inability to provide salaries, benefits, and training for child care teachers continues, it will discourage child care providers from coming to and staying in the East County, thus compounding the problem of providing quality child care in the planning area.

### POLICY IMPLICATIONS

Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.

- o Recognition of child care as a necessary part of family and community development
- o Consideration of the needs of children of all ages, and support of programs to meet the needs of these children

- o Promotion of quality child care as beneficial to social and academic development of children and economic/community development in the East County*
- o Assurance that new development will not exacerbate supply limitations or reduce the quality of child care in the East County*
- o Provision of child care in the East County that is sufficient to meet the needs of children of families associated with new residential, commercial and industrial development*
- o Encouragement of new child care facilities in areas near transportation hubs, clusters of homes or businesses, schools/community facilities, etc.*
- o Provision of transportation between schools and child care facilities*
- o Need for state childcare subsidies for children with special needs, such as children of low income families, children with health needs, limited English speaking children, children of teen parents, homeless children and abused children*
- o Support of initiatives which bolster opportunities for child care providers to obtain adequate training, salary and benefits*
- o Dissemination of information to East County employers regarding the child care employee assistance programs in which they may participate (or which they may initiate for employees)*



## SOURCES

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Alameda County Health Care Services Agency, Maternal and Child Health Services Division, telephone communication, March 5, 1992.

Bateson, Heather, Client Advocate, Valley Family Shelter, Family Crises Center, telephone communication August 6, 1992.

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Resources for Family Development, The 1991 Annual Report on Child Care in the Valley, 1991.

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## **Police Protection**

### **■ INTRODUCTION**

Police protection for the unincorporated portion of the planning area is the responsibility of the Alameda County Sheriff's Department; police services for the incorporated areas are provided by the police departments in each city. The California Highway Patrol, operating out of its Dublin office, has responsibility for traffic law enforcement on state highways and unincorporated roads. Summary information relating to the individual agencies can be found below.

### **■ EXISTING CONDITIONS**

#### **Alameda County Sheriff's Department**

The Alameda County Sheriff's Department currently provides police services for the unincorporated planning area. All emergency vehicles (fire and police vehicles, and ambulances) are dispatched from the Alameda County Sheriff Department's central switchboard. The planning area is included in a patrol beat that covers approximately 320 square miles. The Sheriff's Department has assigned two patrol cars with one officer each to the day shift, and one patrol car with two officers to the night shift. The closest station to the planning area is the Eden Township Substation in San Leandro, 15 miles west of the planning area. Response time to the planning area varies depending on factors such as location of the patrol car in relation to the site of the call and amount of traffic. Under mutual aid agreements, if an urgent call comes in and the County Sheriff's Department officer is at an extended distance from the call, police from the cities of Livermore or Pleasanton, or the California Highway Patrol, would respond to the call until a Sheriff's officer arrived.

#### **City of Dublin Police Department**

The Dublin Police Department provides police services to the City of Dublin. The Dublin Police Department is a division of the Alameda County Sheriff's Department which provides police services to the City through a contractual service agreement between the City of Dublin and County of Alameda. Police department personnel are employed by the County Sheriff's Department. The police department is a full service operation with the exception of dispatch operations, which are provided through the Sheriff's Department Eden Township

Substation in San Leandro. The City has one police station located at the Dublin Civic Center.

The Dublin Police Department operates a three shift schedule with a maximum average of five officers and one sergeant per shift. The department recently added two new complementary narcotics and crime prevention positions to its staff. One position is for drug education and the other position is for drug enforcement. The police-to-population ratio is 1.4 police officers per 1,000 people. Response time is approximately five minutes. The city is not divided into patrol sectors and is patrolled as one beat.

#### **City of Livermore Police Department**

The Livermore Police Department (LPD) provides police services within Livermore city limits. The Department occupies one police station on South Livermore Avenue. The City of Livermore is in the process of planning for a new station capable of accommodating additional personnel. The LPD operates four patrol beats with one officer assigned per shift to each beat. An additional beat is being considered by the Department to respond to growth in the area north of I-580. The LPD currently uses the following personnel generation factors: an additional 1.25 sworn officers and 0.70 non-sworn employees per 1,000 person increase in population.

#### **City of Pleasanton Police Department**

The Pleasanton Police Department provides police services within City of Pleasanton City limits. In 1990, there were 1.37 sworn officers per 1,000 population. Call response time averages 3.2 minutes for emergencies and 21.4 minutes for overall response time. The City Council determines short-term Police Department personnel needs each year.

### **■ PLANNING ISSUES**

New development could place a burden on the Sheriff Department's ability to provide services if the increased increment of property tax revenue does not correspond with the incremental costs to serve new development. Alternative funding mechanisms, such as County Service Areas, can be used to ensure that new development does not pose a fiscal burden on the County or adversely affect the Sheriff's ability to serve development.



■ ***POLICY IMPLICATIONS***

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- o Provision of adequate law enforcement services to new, unincorporated communities in the East County*
- o Assurance of sufficient revenue to pay for the cost of providing law enforcement services to new development*

## SOURCES

Alameda County, Ruby Hill General Plan Amendment EIR, prepared by EIP Associates, November 1989.

City of Livermore, North Livermore General Plan Amendment, Environmental Impact Report, prepared by Environmental Science Associates, January 1992.

City of Dublin, West Dublin General Plan Amendment Specific Plan Study, prepared by WPM Planning Team, Inc., November 1989.

City of Dublin, East Dublin General Plan Amendment/Specific Plan Studies, Environmental Setting, Work Task 9, prepared by Wallace, Roberts & Todd, November 1988.

City of Pleasanton, Growth Management Report, 1991.

## **Fire Protection**

### **■ INTRODUCTION**

Fire protection for the western portion of the planning area is provided through a contract with the California Division of Forestry; the eastern portion of the planning area is served by the Alameda County Fire Patrol. The cities of Livermore and Pleasanton have their own fire protection services within city limits; the city of Dublin operates the Dougherty Regional Fire Authority in conjunction with the city of San Ramon. Summary information relating to these agencies can be found below; the boundaries of each fire district can be seen in Figure 24.

### **■ EXISTING CONDITIONS**

#### **Alameda County Fire Patrol**

Structural and wildland fire protection services are provided in the eastern portion of the unincorporated planning area by the Alameda County Fire Patrol (ACFP). The fire patrol, a division of the Sheriff's Department, has one station on College Avenue in Livermore, which was constructed in 1950 and is considered to be in fair condition. Staffing of the ACFP has declined from 31 in 1986 to the current 13. Average response time throughout the ACFP service area runs between eight and ten minutes.

#### **California Division of Forestry**

The California Division of Forestry (CDF) has responsibility for the western portion of the unincorporated planning area. CDF's local fire-fighting station, the Sunol Forest Fire Station on Pleasanton-Sunol Road, provides structural and wildland fire protection for these lands, which comprise the eastern portion of the Plan Area. The station is only staffed during the fire season, which generally runs from June to November (although it varies from year to year depending on the amount of rainfall and prevailing temperatures).

#### **Dougherty Regional Fire Authority (City of Dublin)**

The Dougherty Regional Fire Authority (DRFA) is a joint powers authority operated by the cities of Dublin and San Ramon. The DRFA serves the entire city of Dublin but only a portion of San Ramon. The DRFA operates from two fire stations, one located in Dublin on Donahue Drive, and the other in San Ramon on Firecrest Lane. The Authority employs a



fire-fighting staff of 45, and is equipped to respond to both structural and wildland fires (it also has the capacity to respond to medical calls).

### **City of Livermore Fire Department**

The Livermore Fire Department provides fire protection and fire fighting services within Livermore city limits. The Department has four stations in the city with a fire-fighting staff of 70 persons. There are a minimum of 14 fire-related staffers on duty at any given time.

### **City of Pleasanton Fire Department**

The Pleasanton Fire Department provides fire protection and fire-fighting services within Pleasanton city limits. The Department has adequate staff and equipment to meet its General Plan response time standard of five minutes. The Department currently maintains three fire stations; a fourth is planned for the southwest portion of the city, but is presently unfunded.

### **Mutual Aid Agreement**

A mutual aid agreement for the Livermore-Amador Valley includes the Alameda County Fire Patrol, Livermore Fire Department, Pleasanton Fire Department, Dougherty Regional Fire Authority, and Livermore Laboratory fire protection service. This arrangement provides necessary backup in case of large fires or multiple calls in which one agency would be unable to meet the demands for service.

### **Insurance Ratings**

A measure of the level of fire protection found within fire service districts is provided by the Fire Insurance Class Rating. This rating is assigned by the State Insurance Services Office to establish the fire insurance rates paid by local residents and businesses. Ratings run from 1 (best) to 10 (worst) and are based on factors such as water supply, equipment, personnel, operations, communications systems, response time, distance of stations, and presence or absence of fire hydrants.

### **Alameda County *Fire Protection Master Plan***

The County's *Fire Protection Master Plan*, adopted by the Board of Supervisors in February 1992, makes a number of recommendations designed to improve the efficiency and effectiveness of fire services. They include:

- o The identification and adoption of service level standards for fire protection and emergency medical response.

- o An improvement of service levels in portions of the East County.
- o A proposal to contract with the Cities of Livermore and Pleasanton to improve emergency response services in the areas currently served by the County Fire Patrol.
- o Reorganization of the County's existing fire protection system into a single consolidated unit which would "eliminate the currently complex, fragmented, and duplicative system of fire services and enable Alameda County to better meet...current and future service demands."
- o Consolidation of the Eden and Castro Valley fire districts with the County Fire Patrol to form a single fire district for the unincorporated portions of the County not covered by CDF contract.
- o Establishment of an advisory committee to explore consolidation possibilities for the Livermore Valley and Sunol. The recommended alternative is that a contract be developed with the cities of Livermore and Pleasanton for emergency response services in the areas currently served by the County Fire Patrol.

## ■ TRENDS

### Consolidation of Fire Districts

Growing fiscal constraints in recent years have provided impetus to efforts to increase efficiencies in the organization of County fire protection services (such efficiencies are considered particularly important with respect to fire protection because it tends to be one of the most expensive public services). While previous proposals to consolidate fire districts have not been successful, the approval of the *Fire Protection Master Plan* in February 1992 has again focused attention on this issue. As noted above, the plan proposes consolidation of the Eden and Castro Valley fire districts with the County Fire Patrol, and advocates exploration of consolidation possibilities for the Livermore Valley and Sunol.

## ■ PLANNING ISSUES

### Impacts of New Development/Population Growth

Considerable new development is planned for each of the three East County cities. This will lead to increased population and increased demand for fire services, facilities and equipment.

It is anticipated that most new development will occur in incorporated areas, although it is possible that North Livermore may be developed in the unincorporated portion of the County. Should the latter occur, the County would retain responsibility for providing fire services to this area and the demand for County fire services would grow; an increase in demand would also occur if a projected increase in the rural population proves accurate.

Whether the various fire service providers will be able to respond to increased demand without lowering existing service levels is a question which must be addressed. This issue is particularly relevant to the rural portions of the planning area served by CDF and the Alameda County Fire Patrol. Average response time in these areas is already significantly longer than in urbanized sections of the planning area; this discrepancy may be exacerbated unless sufficient revenue from new development is channeled into increased funding for fire services.

## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- o Provision of adequate fire services to unincorporated areas in the East County*
- o Equitable allocation of fire service costs, ensuring that new development pays its fair share*
- o Adherence of developers to both the County's service standards and those of any city likely to annex a new community*
- o Design of new development so as to minimize risks to life and property*
- o Conformance of County policy regarding fire services to the terms of the Fire Protection Master Plan*
- o Promotion of maximum efficiency and effectiveness in the structuring of County fire services*
- o Restriction of development densities in high fire hazard areas*



**SOURCES**

Alameda County, Fire Protection Master Plan, prepared by Fire Loss Management Systems, 1992.

Alameda County, Hazard Mitigation Plan for Unincorporated Areas, 1992.

Alameda County Planning Department, South Livermore Valley Area Plan, 1992.

City of Dublin, General Plan, 1985.

City of Livermore, General Plan, 1975.

City of Pleasanton, General Plan, 1986.



## Solid and Hazardous Waste Management

### ■ INTRODUCTION

This report examines the recent legislation guiding waste management in California, describes existing disposal facilities, and looks at policy issues facing the County.

### ■ EXISTING CONDITIONS

#### Background

There is a municipal solid waste disposal crisis in California. The magnitude of the problem was revealed in several 1988-89 background studies prepared for the state legislature. Among the findings:

- 1) In 1980, California produced 2,555 pounds of garbage per person/per year, far exceeding the national average of 1,547 pounds per person (Joint Staff Report of the Assembly Natural Resources Committee and the Assembly Office of Research, April 1988);
- 2) Fifteen California counties (including Los Angeles) will run out of landfill capacity within eight years, and the entire state will exceed its landfill capacity by the year 2000 (Little Hoover Commission, Report on Solid Waste Management: The Trashing of California, July 1989); and,
- 3) An estimated 90 percent of California's waste stream is currently being deposited in the state's rapidly dwindling landfill capacity. By the year 2000, California will produce one-fourth of the entire national output of municipal solid waste although "new landfill development (has) become an almost impossible task" (Senate Task Force on Waste Management, Report on California's Waste Management Crisis, July 1989).

To meet the crisis, the 1989 California legislature enacted Assembly Bill 939, known as the Integrated Waste Management Act. The act gave new powers, a new mandate, and a new name to the former California Waste Management Board, now the California Integrated Waste Management Board (CIWMB). As detailed below, AB 939 requires that all cities and counties develop plans, approved by the CIWMB, for integrated waste management within their jurisdictions. Source reduction strategies and recycling of municipal solid waste are given priority over the combustion (burning) or landfilling of such waste in these plans. Each city and county is required to study its current level of solid waste generation, and to attain a goal of diverting 25 percent of their total municipal wastestream from landfilling and incineration by 1995, and of diverting 50 percent of their wastestream by the year 2000. In sum, the statewide



goal for integrated waste management under AB 939 is to cut in half the state's dependence on landfilling of municipal refuse within ten years.

Existing County waste management policy documents are either in the process of being revised or replaced to conform with AB 939 and other recent legislative actions pertaining to waste management. See **Applicable Plans and Policies** below.

### **Integrated Waste Management Defined**

The term "integrated waste management" refers to the complementary use of a variety of waste management options. These options include source reduction, or producing less waste in the first place; waste diversion, or recovering waste for use in new products by recycling or composting; transformation, or converting unsorted or partly-sorted waste into energy, either by direct incineration or by fuel pellet; and, landfilling, or the placement of remaining wastes at a landfill site. The goal of integrated waste management is to effectively handle all solid waste in a coordinated and environmentally sound manner. To accomplish this goal, various wastes are matched with those management options or techniques that best suit them in order to reduce toxics, reduce volume, and to conserve energy and resources. Those wastes that cannot be reduced, reused, or recycled are then incinerated or disposed of in a landfill.

### **Existing Landfills**

The Altamont Sanitary Landfill and the Vasco Road Landfill, located in the East County planning area, handle most of the County's solid waste (see Figure 7). The Tri-Cities Recycling and Disposal Facility in Fremont, formerly Durham Road Landfill, is the County's only other active landfill. All three landfills are Class III disposal sites, a classification which permits receipt of municipal solid waste with separate disposal areas required for asbestos and auto shredder wastes. (A portion of the Tri-Cities landfill has been designated Class II, which allows receipt of designated hazardous wastes - see discussion of **Hazardous Waste Disposal** below). These three landfills provide for the disposal needs of all jurisdictions within Alameda County. Total County-wide disposal capacity was approximately 48.6 million cubic yards as of January 1, 1991. The rate at which this capacity is depleted will be based on future waste generation and diversion rates, which determine the amount of waste to be disposed. An evaluation of possible future waste-disposal scenarios for Alameda County estimated that County-wide permitted capacity could expire by 2003 under currently permitted facilities (Time Extension of Importation of Contra Costa County Waste to the Altamont Sanitary Landfill EIR, August 5, 1991).

Additional waste management facilities in the planning area include the City of Pleasanton Transfer Station on Busch Road off Valley Avenue operated by the Pleasanton Garbage Service, Inc. and a recently approved household hazardous waste drop-off center to be located off Vasco Road and Brisa Street in the City of Livermore.

Altamont Sanitary Landfill. The Altamont Sanitary Landfill is owned and operated by the Oakland Scavenger Company, a 2,170 site located north of I-580 in the Altamont Hills. Approximately 60 percent of the County's waste stream is disposed of at this facility. Solid

waste originating in the following jurisdictions is disposed of at the Altamont Sanitary Landfill: the cities of Alameda, Albany, Dublin, Emeryville, Hayward, San Leandro, Oakland, and Piedmont; and the Castro Valley and Oro Loma Sanitary Districts.

Once collected, most municipal solid waste is taken to the Davis Street Transfer Station in San Leandro where it is transferred from packer trucks (refuse collection trucks typically used to collect residential wastes) into transfer trucks and hauled to the landfill. Commercial, construction/demolition, nonhazardous industrial, and institutional wastes, and residential wastes from the City of Dublin and the unincorporated area of the County near the City of Livermore is hauled directly to the site.

As of January 1991, the remaining capacity of the designated 225-acre fill area was estimated at nearly 24 million cubic yards. At current disposal rates, Oakland Scavenger Company estimates this remaining capacity will be exhausted in 1997. Altamont currently has two pending conditional use permit applications. Approval of these permits would allow a 1,020-acre expansion of the designated fill area, increasing the total capacity to 350 million cubic yards, and would reclassify the balance of the existing designated fill area from Class III to Class II to allow designated waste disposal at the site.

Vasco Road Sanitary Landfill. The 644-acre Vasco Road landfill site is located just west of the Altamont facility on Vasco Road. It is owned and operated by Browning Ferris Industries, Inc., and receives solid waste from the cities of Berkeley, Pleasanton, and Livermore, and self-haul waste from County-wide sources. Municipal solid waste is processed at both the Berkeley Transfer Station and Pleasanton Transfer Station before transportation by transfer truck to the Vasco facility.

As of January 1991, the remaining capacity of the designated 226-acre fill area was estimated at about 22.5 million cubic yards. With a projected four percent annual increase in the waste stream, Browning Ferris Industries estimates this facility has approximately 14 years of remaining capacity. The company has applied for an 86-acre Class II Sanitary Landfill Expansion designed to hold an additional 12.1 million cubic yards of refuse. As of this writing, project environmental review is underway.

### **Landfill Importation Agreements**

A recent Supreme Court decision has made it illegal for jurisdictions to discriminate by origin in accepting solid waste at their landfill sites. The Altamont and Vasco Road landfill sites have the potential to function as regional landfill facilities for both the County and other jurisdictions lacking adequate landfill capacity. The County, therefore, allows importation of solid waste if (non-discriminatory) mitigation can be provided to cover environmental liability and costs associated with importation such as road wear-and-tear and lost landfill capacity.

Nearly all municipal solid waste from San Francisco is disposed of at the Altamont Sanitary Landfill via the Sanitary Fill Transfer Station (located on the boundary between San Francisco and the City of Brisbane) due to the lack of available disposal sites within the boundaries of the City and County of San Francisco. Municipal solid waste is hauled from the Sanitary Fill



Transfer Station to the Altamont Sanitary Landfill in accordance with agreements (adopted in 1988) between Oakland Scavenger Company and Sanitary Fill Company, and between the Alameda County Waste Management Authority and San Francisco. The terms of the agreements allow for disposal of up to 15 million tons of municipal solid waste and 130,000 tons per year of wastewater treatment sludge over a 65-year time limit. The agreements acknowledge that expansion areas would be needed for Oakland Scavenger to fulfill its contract with Sanitary Fill Company.

A two-year waste importation agreement with Contra Costa County that allowed disposal of municipal solid waste at the Altamont site expired on December 18, 1991.

### **Hazardous Waste Disposal**

Hazardous waste is defined in the California Health and Safety Code (Section 25117, et seq) as, "a waste or combination of wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may either ... cause or significantly contribute to the mortality or an increase in serious irreversible, or incapacitating reversible, illness or pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, or disposed of, or otherwise managed ... " There are no permitted landfill facilities which can accept Class I (Hazardous Wastes) in the County. These materials must be transported at great expense to Kettleman City in the Central Valley for disposal.

As noted above, a portion of the Tri-Cities Landfill has been permitted for Class II (Designated Wastes) disposal. Two current applications would allow Class II to be deposited at the Altamont and Vasco Road Sanitary Landfill sites. Class II landfills are allowed to accept designated wastes as well as non-hazardous wastes. Designated waste is (1) nonhazardous waste that consists of or contains pollutants that, under ambient environmental conditions at the landfill, could be released at concentrations in excess of applicable water quality objectives, or that could cause degradation of waters of the State; or (2) hazardous waste that has been granted a variance from hazardous waste management requirements pursuant to Section 66310 of Title 22 of the California Code of Regulations. Hazardous wastes can be discharged at Class II landfills that comply with the applicable provisions of CCR Title 23 only with approval from the Regional Water Quality Control Board for containment of the particular kind of waste to be discharged (CCR Title 23, Section 2522).

About one percent of the total residential solid waste disposed per year consists of illegally disposed Household Hazardous Wastes (HHW). Examples of HHW stored in homes and garages include leftover paints, solvents, antifreeze, used oil and auto batteries, cleansers, furniture polish, pesticides, and pool chemicals. These materials are frequently disposed of in sewers, storm drains, and the soil. In the past there has been no active HHW collection or recycling program in the unincorporated County, however, load checking for hazardous waste occurs at the Altamont and Vasco Road landfills.

The County has prepared its Household Hazardous Waste Element (February 25, 1992) as part of AB 939 requirements (see below). The new HHW program includes three components essential to optimize program effectiveness: the creation of three permanent facilities for HHW



collection (located in Oakland, Hayward, and Livermore); the recycling of HHW; and public education and information programs.

The first priority of the County will be to encourage source reduction, reuse, and recycling of HHW on site. This will be achieved through a comprehensive public education program that will be managed by the County Department of Environmental Health. The second priority will be reuse and recycling off-site. In this program all of the HHW will be either recycled, reused, or disposed at an appropriate disposal facility. There will be three permanent collection facilities located in the north, south, and east county that will be the responsibility of the County Department of Environmental Health, Health Services Department. These proposed permanent collection facilities will receive, recycle, and transfer hazardous waste from households and mini-generators for out-of-county disposal. The operation of each facility will consist of collection, chemical identification, sorting, storing, lab packing, and recycling. The facilities will accept all hazardous wastes that are delivered except for radioactive wastes and explosives.

Every city in Alameda County has agreed to support and publicize the Countywide permanent HHW facility program. Castro Valley will add motor oil and latex paint to its curbside recycling program. Load checking at all landfills in the County will continue to minimize the risk of HHW getting into the landfill and the program will be monitored to ensure its effectiveness.

As of January 1, 1992, AB 869 (Farr) required lead agencies under CEQA to consult the "Cortese List" to determine whether any project or its alternative sites are located on sites which were designated by the State Departments of Health Services, Toxic Substances Control, Water Resources Control Board, Air Resources Board, or the California Environmental Protection Agency as containing hazardous wastes or substances. The lead agency must specify the list and include the information in any Notice of Preparation, Draft EIR, or Negative Declaration. A Cortese List has been prepared for Alameda County.

### **State and Regional Waste Management Regulations**

California Integrated Waste Management Act of 1989 (Assembly Bill 939, Sher) (Public Resources Code §4000, et seq.). AB 939 establishes a new hierarchy of waste management practices for state and local level planning, including (in preferential order of diversion practice) source reduction, recycling and composting, environmentally safe landfill disposal, and environmentally safe transformation, where certain materials such as wood waste can be converted to fuel pellets. The goals of AB 939 are to divert the amount of solid waste generated in the state to the maximum extent feasible; to improve regulation of landfills; to streamline permitting procedures for solid waste facilities; and to specify the responsibilities of local governments to develop and implement integrated waste management programs.

AB 939 consists of four major parts: 1) the Act replaces the California Waste Management Board with the California Integrated Waste Management Board (CIWMB); 2) it establishes a new planning process and requires that cities and counties formulate plans to attain the diversion objectives noted above; 3) it strengthens the certification criteria and performance standards for Local Enforcement Agencies (LEA), the local enforcement representative of the CIWMB; and,

4) it consolidates and reorganizes existing solid waste law in the Public Resources Code (Chapter 23, Section 14). The CIWMB is the principal State agency regulating solid waste management facilities; its primary function is to implement the goals and policies of AB 939 and related legislation.

Specific plans required by AB 939 regulations include: 1) a Source Reduction and Recycling Element (SRRE) by cities and county; 2) a Household Hazardous Waste Element (HHWE), as amended by AB 2707, by cities and county; 3) a Non-Disposable Facility Element by cities and county; and, 4) an Integrated Waste Management Plan (CoIWMP), including a county-wide Siting Element, by county.

Cities and counties are required to prepare plans to divert 25 percent of solid wastes generated from landfill disposal by 1995, and 50 percent by the year 2000. The Siting Element will provide a description of the areas to be used for development of disposal (or transformation) capacity for a 15-year planning period, commencing in 1991. Section 41703 requires that if a county's disposal capacity will be depleted within 15 years, the County must either designate a site for the location or expansion of a disposal site, or include a specific strategy for the disposal of solid wastes in excess of remaining capacity.

Assembly Bill 2296 (Public Resources Code §50000, et seq.). AB 2296, often referred to as the "Gap Bill," specifies procedures for planning, approving, and siting solid waste projects during the transition period when CoIWMP's are being developed to replace the previously mandated Solid Waste Management Plan (CoSWMP) as the counties' primary solid waste planning document. Pending approval of the CoIWMP by the CIWMB, no city or county may establish a new or expand an existing solid waste facility which will result in a "significant increase" in the throughput capacity at the facility unless specific conditions can be met.

Title 14. Chapter 3 of the California Code of Regulations - State Minimum Standards for Solid Waste Handling and Disposal. The purpose of the regulations contained in Title 14 is to promote public health, safety, and welfare, and to protect the environment. Articles 6 and 7 of Chapter 3 provide minimum standards for operating transfer/processing stations and disposal sites, respectively. Sections within Articles 6 and 7 require facility operators to provide adequate equipment, personnel, support facilities, and environmental controls at the site, and to file reports with the LEA detailing the site operations. Sections 17676 through 17683 specify minimum performance criteria for developing a fill area.

Although AB 939 requires that the CIWMB revise and adopt State standards of solid waste handling, no new regulations have been adopted to date.

Assembly Bill 2707 (LaFollette. 1990) (Public Resources Code §41003, et seq.). In addition to requiring cities to prepare Household Hazardous Waste Elements, AB 2707 revises state law regarding the exportation of solid waste from a city or county to any other jurisdiction. The law prohibits the exportation of solid waste to any jurisdiction unless the exporting county has, by January 1, 1992 or a later date specified by the CIWMB, obtained approval for and implemented a HHWE and SRRE, or submitted a County-wide Integrated Waste Management Plan with which it is in compliance. The law permits jurisdictions to assess special fees of a reasonable amount



on the importation of waste from outside of the county, and does not specify how the fees must be used.

### **Local Waste Management Agencies**

California law places responsibility for the provision of solid waste collection, processing, transfer, and disposal with local jurisdictions. State standards are enforced by local officials through Local Enforcement Agencies (LEA). The LEA has the primary responsibility for ensuring that a solid waste management facility complies with all applicable federal, state, and local regulations.

The Alameda County Department of Environmental Health, Office of Solid/Medical Waste Management is the LEA designated by the Alameda County Waste Management Authority responsible for enforcement in East County. The LEA is responsible for enforcing Title 14 standards. Enforcement programs and field inspections of solid waste storage, collection, and transport operations, and inspection of transfer stations and disposal sites for compliance with state standards. The LEA has the primary responsibility for issuing, modifying, and revising Solid Waste Facilities Permits (SWFP).

By virtue of a Joint Powers Agreement among the County, the incorporated cities, and the sanitary districts of Alameda County, the Alameda County Waste Management Authority ("Authority") is responsible for waste planning, policy-making, and budgeting in the County. The Authority is charged with preparing, implementing, and enforcing the Alameda County Integrated Waste Management Plan (CoIWMP) as well as implementing and enforcing the existing County Solid Waste Management Plan (CoSWMP) until replaced by CoIWMP. Any major changes or developments in the County's waste management system are subject to Authority approvals, and must be found to conform to the CoSWMP and, when adopted, to the CoIWMP. The CoIWMPs will be required to be updated every five years.

### **Applicable Plans and Policies**

The Source Reduction and Recycling Element (SRRE) and the Household Hazardous Waste Element (HHWE) for the unincorporated area of Alameda County have been adopted. (The HHWE is discussed above under **Hazardous Waste Disposal**.) The SRRE (Volume I, December 1991) contains proposed source reduction programs needed to reach or exceed the 25 percent and 50 percent waste diversion goals. Preliminary data reveal that about 28 percent of the Alameda County waste stream is diverted from landfilling (Edminster, 1991). Similarly, the current waste diversion rate for the City and County of San Francisco is estimated to be at least 25 percent (Johnson, 1991). Under the SRRE, a County regional composting facility has been proposed for the unincorporated Altamont area of the East County.

Alameda County's Solid Waste Management Plan (CoSWMP) continues to serve as a valid document at the local level as well as providing a mechanism for project approval until a County Integrated Waste Management Plan is approved. The deadline for approval of each CoIWMP



(including all approved Elements) is based on the county's remaining landfill capacity; under this criteria, March 1995 is the earliest possible date for adoption of Alameda County's CoIWMP.

Landfill Capacity. Existing policy under CoSWMP calls for the provision of a 50-year fully-permitted landfill capacity and the Authority will pursue this policy under CoIWMP (personal communication with Dick Edminster, Planning Manager, Alameda County Waste Management Authority):

*Plan Administration Policy 5:* Because the capacity of existing landfill sites in Alameda County is limited, the Authority shall have as an initial priority to acquire, in public ownership, reserve landfill capacity to serve the needs of all Alameda County jurisdictions for a minimum of 50-year continuous period.

To this end, the Authority is in the process of identifying and acquiring a publicly-owned Integrated Waste Management Facility in the Altamont Hills of East County. Although a specific facility site has not been identified, a program EIR has been prepared (Altamont Hills Landfill Program, 1989). General characteristics of the facility being considered include: a lifespan of 100 years, a capacity of 307 million cubic yards or 215 million tons, an approximate area of 5,000 acres, sited on non-irrigated grazing lands with commercial wind energy production, and located within an area of the same land uses. Siting criteria and engineering and environmental considerations may reduce the size of the facility once a specific site has been chosen. It is anticipated that the proposed facility could be ready for construction by 1997 (personal communication with Dick Edminster, Planning Manager, Alameda County Waste Management Authority).

The Altamont and Vasco Road sanitary landfill expansions proposed by the private companies owning those facilities are not currently being considered by the Authority for inclusion in the CoIWMP. According to the Authority, their capacity is not required to meet the County's long-term needs, provided that the Authority's Integrated Waste Management Facility is constructed as proposed.

Any person who proposes to construct or operate a new solid waste facility (including transfer stations, disposal facilities, and facilities for materials recovery or processing, composting, or transformation), or significantly expand or modify the operation of an existing facility, must apply to the Authority for a Determination of Conformance with the county-wide Siting Element. Before the Authority can make a Determination of Conformance, the local jurisdiction where the facility is located must give its permitting approval. The new Altamont Hills landfill facility proposed by the Waste Management Authority as well as the regional composting facility proposed under the SSRE will require prior approval by Alameda County.

Handling of Special Wastes. The CoSWMP addresses the handling of sewage sludge as follows:

*Management Operations Policy 2(b):* The Authority recognizes that sludge disposal is an integral part of solid waste management. It further recognizes that there is an urgent and long-term need to provide disposal adequate to handle Alameda County sludge derived from municipal water and wastewater facilities.

*Management Operations Policy 2(b(4))*: It shall be a priority of the Authority to study countywide sludge disposal alternatives including reuse, incineration, composting, regulatory trends in the sludge management area, availability of regional disposal facilities, and the possibility of siting an approved sludge disposal site in Alameda County. The Authority shall update this study with each triennial review of the Solid Waste Management Plan.

## ■ TRENDS

### **Siting of Regional Landfill and Hazardous Waste Facilities Have Become Increasingly Difficult Due to Public Concern and Higher Costs.**

The siting of new landfill facilities has become increasingly difficult due to a variety of factors, including:

- . public concern with closure and cleanup problems
- . NIMBYism (Not in My Back Yard), perceived environmental racism, resistance to change
- . special interest group lawsuits
- . higher land costs
- . siting costs associated with stricter federal, state, local and other agency regulations
- . new siting standards for disposal of common household and industrial hazardous wastes

Only two new landfill sites have been fully permitted in California since 1984. There are also fewer and more costly alternatives available for disposal of hazardous materials. As communities resist creation of facilities which can handle either household hazardous wastes (HHW) or accept Class I hazardous wastes, siting problems for HHW drop-off facilities are also increasing. Although two sites have already been approved in the cities of Hayward and Livermore, resistance to an Oakland site serving North Alameda County may jeopardize initiation of the program.

### **Landfills Are Evolving into Integrated Waste Management Facilities**

With the new recycling, composting, and other landfill diversion programs mandated by legislative action, sanitary landfill sites are beginning to serve a multitude of functions. AB 939-mandated diversion programs will encourage consolidation of resources and facilities for more efficient, long-term operations. The County's landfill sites now operate up to 22 hours per day with increased rates of disposal due to local growth and importation of municipal solid waste.



## **Land Use Conflicts Will Increase as Urban Growth Encroaches on Landfill Areas**

Like airports, sanitary landfills were, until recently, located in remote areas. As development expands outward from City centers, land use conflicts will occur no matter where new facilities are sited. Impacts to urban land uses from the operation of landfills include traffic, noise, odors, litter, disease vectors, and dust.

## **■ PLANNING CONSIDERATIONS**

### **Landfill Capacity**

The County Waste Management Authority's policy calling for a 50-year continuous landfill capacity can be achieved either by expansion of existing privately-owned facilities or by acquiring a new publicly-owned facility. Either alternative would provide from 50 to 100 years of disposal capacity beyond 2003, the year when existing capacity is estimated to expire. Implementation of both alternatives would double this lifespan estimate. (The lifespan of a landfill cannot be estimated with complete assurance due to the inability to predict the amount of solid waste that will be imported to the site from sources outside the County.) Over the next 20 years, the East County is projected to grow by 5.2 percent annually (ABAG 92). Although this growth rate somewhat exceeds the 4 percent annual growth rate used by the Authority in calculating landfill capacity in terms of years, it is safe to conclude that at least 50 years capacity will remain by the year 2010 under either scenario (i.e., expansion or new facility).

### **Alternative Diversion Methods**

As new techniques and methods are developed to divert waste materials, flexibility in the permit process must be developed to accommodate these uses. Bio-remediation of contaminated soils and the co-composting of sewage sludge and municipal solid wastes are new diversion techniques to reduce the amount of waste going into a landfill.

Programs initiated by the State Department of Hazardous and Toxic Substances to replace leaky gasoline/oil storage tanks have resulted in stockpiles of contaminated soils. These soils are contaminated with benzene and other petroleum products which often can be removed, restoring the soil for productive use (such as backfill, daily cover in landfills, and as base layers of silt for gardens). Currently, soil remediation and related new remediation technologies do not fit under permitted or conditional land uses as defined in the County's zoning ordinance. Direct application of sewage sludge as a soil amendment or composting of sewage sludge with municipal solid waste for use in landscaping, agriculture, and cover material at landfills is also hampered by existing permitting limitations. The need to divert sewage sludge will become more urgent as the number of advanced water recycling plants generating significant amounts of sludge increases in the planning area (see the *Water Supply* and *Wastewater* background reports in Section D). Facilitating disposal of sewage sludge would assist the Authority in implementing their management operations policies.



**Land Use Conflicts**

Although land use conflicts resulting from the operation of landfills in urbanizing areas cannot be eliminated completely, potential impacts can be mitigated through conditions of approval of expansion of existing landfill facilities and/or new landfill facilities. Ongoing impacts on open space values (e.g., visual, recreational, grazing) before closure and restoration of landfill sites are also issues of concern. Measures such as screening, buffer zones, noise controls, and appropriate reclamation methods may be required for mitigation. Many land use conflicts will be minimized through the siting criteria to be developed in the new Siting Element.

**■ POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- . coordinate solid and hazardous waste planning with the Alameda County Waste Management Authority*
- . support 50-year continuous landfill capacity policy by allowing expansion of existing facilities and/or permitting a new facility*
- . minimize land use conflicts between waste management facilities and adjacent land uses*
- . support recycling and composting efforts*
- . expand definitions of conditional uses in the Agricultural and Industrial Zoning districts to allow for new waste diversion methods*

## **SOURCES**

Alameda County, Final Draft, Alameda County Unincorporated Area Source Reduction and Recycling Element and Household Hazardous Waste Element, Volume 1, December 1991

Alameda County, Final Draft, Alameda County Unincorporated Area Source Reduction and Recycling Element and Household Hazardous Waste Element, Volume 2, February 25, 1992.

Environmental Science Associates, Time Extension of Importation of Contra Costa County Waste to the Altamont Sanitary Landfill DEIR, prepared for Alameda County, August 5, 1991.

## Major Public Facilities and Utilities

### ■ INTRODUCTION

There are many major facilities and utilities located in the East County that may affect and be affected by land uses located in their vicinity. Because of their size and/or the nature of their functions, these facilities may be incompatible with some types of land use. Therefore, they require special consideration when development is considered near them.

Major public facilities in the East County are the U.S. Army's Parks Reserve Training Center (Camp Parks); Santa Rita County Jail; the Federal Correctional Facility, Pleasanton; Livermore Municipal Airport; Federal Communications Commission Monitoring Station; Lawrence Livermore National Laboratories; Sandia National Laboratories; General Electric Vallecitos Nuclear Center; and the U.S. Veterans Hospital. Figure 25 shows the locations of these facilities. Major utilities include electrical powerlines and substations, and oil and natural gas pipelines. Figure 26 shows the approximate locations of the major electrical facilities and Figure 27 shows the approximate locations of the major pipelines.

### ■ EXISTING CONDITIONS

#### Camp Parks

The U.S. Army's Parks Reserve Forces Training Center is located on a 2,884 acre site on the eastern side of the City of Dublin, within the city boundary. Most of the development on the site (consisting of barracks, training areas, classrooms, and administration buildings) is located adjacent to I-580 on the southern portion of the area. To the north, the area is largely vacant, with portions used for leased grazing and a light artillery range. The vacant area is also used for troop maneuvers, small arms firing, helicopters and other heavy equipment. A communications satellite tracking station operated by Lockheed is located on a 11.6 acre site on the eastern side of Camp Parks.

In 1990, the Army completed a *Master Plan* and EIS to guide future land use and development on Camp Parks. Adoption of the *Master Plan* is on hold while the Army evaluates the potential relocation of uses to Camp Parks from other Army installations that are closing.

#### Prison Facilities

There are two major prison facilities in the planning area: the Santa Rita County Jail and the Federal Correctional Facility, Pleasanton. Both facilities are located in the Camp Parks area of Dublin.



Santa Rita County Jail. The Santa Rita Jail is operated by the Alameda County Sheriff's Department. The jail is a new facility constructed in 1989 and can house up to 3,400 prisoners. Currently, excess jail space is being leased to the City and County of San Francisco and the Federal Bureau of Prisons.

Federal Correctional Facility. The Federal Correctional Facility, Pleasanton, is operated by the United States Department of Justice, Federal Bureau of Prisons. The facility is composed of three units: the Federal Correctional Institution, Federal Detention Center, and Federal Prison Camp. The Federal Correctional Institution was opened in 1974, and serves as a facility for housing female inmates at all security levels. The facility is composed of eleven buildings. The Federal Detention Center is an all male facility and was opened in 1989. The primary purpose of the detention center is to house pre-trial offenders and parole violators for the United States Marshal's Service for the Northern District of California. The detention center consists of two housing units with a capacity of 198 persons. The Federal Prison Camp was opened in 1990. It is an all-male facility and serves as a work cadre unit for 172 inmates.

### **Livermore Municipal Airport**

Livermore Municipal Airport, owned and operated by the City of Livermore, is one of three general aviation airports in Alameda County and is the only airport in the East County. The airport serves the Tri-Valley area which includes the Alameda County cities of Dublin, Livermore, and Pleasanton and the Contra Costa County cities of San Ramon and Danville. Other nearby general aviation airports are Hayward Air Terminal in Hayward, Byron Airport near the town of Byron in eastern Contra Costa County, and Tracy Municipal Airport in Tracy, San Joaquin County.

Livermore Airport is located south of I-580 near the Airport Boulevard interchange on a 531-acre site. The airport was relocated to its present location in 1965 because urban development had encroached on its previous location. The airport is located within Livermore City limits; unincorporated lands lie to the west, south and north (north of I-580) of the airport.

Livermore Airport is intended to provide a full range of general aviation services to the residents of the East County. Services include facilities for pilots and aircraft, general aviation aircraft basing, airport commercial businesses and support services. The airport also serves as a flight training facility for future pilots. There are currently 607 aircraft based at the airport. The number of aircraft is expected to increase as population and business development in the East County area increases.

The airport complex consists of an air terminal and Federal Aviation Administration air traffic control tower, an airfield with two parallel runways and taxiways, aircraft hangers, and commercial and corporate aviation facilities and services.

The airfield consists of two parallel runways of unequal length. Runway 7L-25R, the principal runway, is 100 feet wide, 5,250 feet long, is fully instrumented for operations during instrument meteorological conditions, and is used by all types and classes of aircraft including large turboprop and business turbojet aircraft. Parallel Runway 7L-25L is 75 feet wide and 2,700 feet

long. Because of its limited length and absence of instrumentation, Runway 7R-25L is used by various types of single and light, twin-engine propeller aircraft. No turbojet operations are conducted on this runway which serves light, general aviation aircraft exclusively. The runways are used no more than 85 percent of the time due to prevailing winds and published noise abatement advisories.

The *Airport Master Plan for Livermore Municipal Airport (1975)* and the *Airport Layout Plan*, a component of the *Airport Master Plan*, identify the long term program for development of airport facilities. Runway 7L-25R was extended in 1987 completing a major portion of the airfield development program. Currently, there are no plans to significantly expand the airfield (i.e., new or extended runways). The *Airport Layout Plan* includes plans to provide new aprons, hangars, taxiways and other facilities as needed to serve additional aircraft based at the airport.

The Alameda County Airport Land Use Commission (ALUC) is responsible for evaluating the compatibility of existing and proposed land uses near the airports within the County and airport operations. The ALUC's purpose is to prevent the creation of new safety and noise problems in areas near public airports. Of the seven ALUC commissioners, two are appointed by the airport managers, two by the County Mayors' Conference, and two by the County Board of Supervisors. The ALUC is responsible for preparing the *Alameda County Airport Land Use Policy Plan*, which contains standards to determine ALUC planning boundaries and policies that apply within those boundaries. The current *Alameda County Airport Land Use Policy Plan* was adopted on July 16, 1986.

State ALUC law requires local public agencies to refer proposed projects to the ALUC for determination of consistency with the ALUC plan, prior to final action by the governing body of the local public agency. The ALUC has adopted a General Referral Area in the vicinity of each airport. For each airport, the ALUC has also adopted Safety Zones within which land uses should be limited in density and type due to accident potential. The General Referral Area and Safety Zones for the Livermore Airport are shown in Figure 28.

The Height Referral Area is another ALUC planning boundary. It delineates the airspace of concern to ALUC due to possible hazards to air navigation caused by tall structures. Any local public agency action which is subject to ALUC review under state ALUC law, and which would permit an object to protrude into the identified airspace, must be referred to ALUC for determination of plan consistency. Where an adopted ALUC Height Referral Area extends beyond the General Referral Area, only those local agency actions that are subject to ALUC review and would affect the height of uses within the identified airspace must be referred to the ALUC. Figure 29 shows the Height Referral Area for the Livermore Airport.

The Regional Airport Planning Committee, which is jointly sponsored by the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC), is responsible for preparing the *Regional Airport Plan*. The Livermore Airport has been identified in draft scenarios for the new *Regional Airport Plan* as one of five Bay Area general aviation airports that should be expected to have significantly increased traffic in the future. Other general aviation airports in the Bay Area, such as Reid-Hillview Airport in San Jose, Hayward



Air Terminal, Palo Alto and San Carlos Airports, are located in areas with restricted airspace because of their proximity to major air carrier airports, such as San Francisco, Oakland, and San Jose International Airports. Another constraint to these general aviation airports is their location within heavily urbanized areas containing large expanses of residential areas within the vicinity of the airports. Livermore's favorable circumstances in relation to other Bay Area general aviation airports are the basis for the proposed designation of Livermore Municipal Airport as a "regional airport."

### **Federal Communications Commission Monitoring Station**

The Federal Communications Commission (FCC) Monitoring Station is located in the North Livermore subarea on a 117-acre site between May School Road and Hartford Avenue, north of I-580 and just west of the Livermore city limits in unincorporated Alameda County. The FCC station was established in 1947 and is one of fourteen monitoring stations located throughout the United States and Puerto Rico. The three main function of the station are: 1) HF long-range direction finding, aiding vessels and aircraft in distress or with navigational equipment problems; 2) spectrum management (HF, VHF, UHF) tasks using monitoring and radio law enforcement facilities; and 3) solution of international radio interference problems, cross-border disputes and negotiations, and the maintenance of international treaty obligations. To accomplish these tasks, the station employs a wide variety of antennas and a long-range direction finder.

The location of the monitoring station was established at its present site based on the site's direction-finding baselines, relative distance to other monitoring stations in the United States, proximity to the San Francisco Bay region and the more densely populated portion of the Central Valley, and physical site characteristics (e.g., level terrain, no obstructions such as mountains, hills, large structures or other objects that would project to a vertical angle more than three degrees above the horizontal as viewed from the long range direction finder location; soils with high electrical conductivity; and an absence of lakes, ponds, creeks, drainage facilities or other large bodies of water within one mile of the center of the site). Because certain types of urban development may cause electromagnetic interference with the monitoring station's equipment, certain intensities of residential or industrial uses within one mile of the FCC facility could be incompatible with FCC operations. Sources of interference can include ignition noise from traffic on major roads, various types of equipment used in industrial processes, and electric substations or any other high frequency radiation devices. Potential interference from radio transmitters in the vicinity of the station, such as those operated by public agencies, private individuals, and private businesses, is regulated by FCC licensing rules.

The potential for the monitoring station's high frequency radio transmitting facility to affect any future surrounding residential and commercial development by causing interference with televisions, radios, stereos and other similar equipment is small. At the present time, the high frequency transmitters are used only sporadically and for no more than a few minutes once a week to ensure they are functioning properly for use in case of a national emergency.



### **Major Research Facilities**

Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore are major federal research facilities located in unincorporated Alameda County, east of Livermore, between Vasco and Greenville Roads. While both facilities are owned by the U.S. Department of Energy, they are separate facilities operated by different contractors. General Electric Vallecitos Nuclear Center, a third research facility, is located on Vallecitos Road, south of Pleasanton and is owned and operated by the General Electric Company.

Lawrence Livermore National Laboratory. Established in 1952, Lawrence Livermore National Laboratory (LLNL) is operated by the University of California (UC) for the United States Department of Energy (DOE) on an 821-acre site east of Livermore. UC's contract with DOE was recently renewed for another five years. The new contract will expire in 1997. LLNL serves as a national resource facility for scientific, technical, and engineering research with a special emphasis on national security. LLNL's mission also includes research and development relating to strategic defense, arms control and treaty verification technology, energy, the environment, biomedicine, the economy, and education. Current major programs include Defense and Related Programs, Laser Fusion, Laser Isotope Separation, Magnetic Fusion Energy, Biomedical and Environmental Research, Energy and Resources, and Environmental Restoration and Waste Management. LLNL, the largest employer in unincorporated Alameda County, employs approximately 7,800 people.

LLNL also operates LLNL Site 300, a 7000 acre site located almost entirely within San Joaquin County, approximately 15 miles southeast of the LLNL Livermore site. A narrow strip of the property is located within Alameda County, along the County's eastern boundary. The primary use of this site is the testing of non-nuclear high explosives. LLNL also leases several small offsite properties in the Livermore area.

Sandia National Laboratories, Livermore. Sandia National Laboratories, Livermore (SNLL) was established in 1956 to support LLNL in ordnance engineering. SNLL is one of three National Laboratories operated by the Sandia Corporation, a wholly owned subsidiary of AT&T, for the Department of Energy. DOE and AT&T have announced that AT&T does not intend to renew its contract to operate Sandia National Laboratories, including SNLL. AT&T will continue to operate SNLL until the current contract expires on September 30, 1993. DOE will select another contractor to manage and operate Sandia National Laboratories and assumes that the new contractor for SNLL will continue to operate it at the current operational level.

SNLL's principle mission is national security, with emphasis on the engineering of non-nuclear systems and components associated with nuclear weapons development. Other tasks related to national security conducted in support of the U.S. Department of Defense include nuclear materials safeguards and security, treaty verification and control, intelligence on foreign technologies and weapons systems, and waste management. In addition, SNLL is performs basic and applied research and development in support of national energy programs. SNLL employs about 1,200 people (including contract employees). SNLL's facility is located on a 413-acre site adjacent to LLNL.

General Electric Vallecitos Nuclear Center. The General Electric Vallecitos Nuclear Center was established in 1957 on a 1,594 acre site south of Pleasanton. General Electric operated a nuclear test reactor, which generated a limited amount of electricity, on the site until 1962. Currently, 155 full-time employees and approximately 50 contract employees at this facility conduct a variety of research and development activities involving such areas as general chemistry, improving the efficiency of nuclear fuels, improving components for nuclear reactors, and medical isotopes used for diagnosis. No changes are anticipated in the facility's current operations.

### **Veterans Administration Hospital.**

The Veteran's Medical Center, operated by the U.S. Veterans' Administration for the exclusive use of U.S. veterans, is located on a 169 acre site on Arroyo Road, south of Livermore. Currently, the facility has approximately 460 employees. Under normal conditions the Medical Center consists of a 120-bed nursing home care facility and a 105-bed hospital. Construction currently underway has temporarily lowered the number of hospital beds to 69. This number is expected to return to 105 after the construction is completed in a few years. No other changes are anticipated in the operations of the facility at the present time.

### **Public Utilities**

Electrical Powerlines and Substations. The East County is traversed by various 69-, 115-, 230- and 500-kilovolt electric transmission lines, all of which are located above ground. Pacific Gas & Electric (PG&E) owns and operates all of these lines, with the exception of a 230-kilovolt line, owned by Western Electric, which runs from the Tracy substation to Lawrence Livermore Lab.

There are also several substations located in the East County. Two major substations in the planning area serve as distribution points for various lines and voltages: Tesla, owned and operated by PG&E; and Tracy, owned and operated by Western. There are eleven 69-kilovolt substations in the planning area including: South Bay, Altamont, Vasco, Las Positas, Livermore, Parks, Kaiser, Radium, Iuka, Vallecitos, and Sunol. Lawrence Livermore Lab operates a 115-kilovolt substation. Figure 26 shows the approximate locations of power transmission lines and electrical substations.

Oil and Natural Gas Pipelines. Many oil, natural gas, and petroleum product pipelines (carrying products such as aviation fuel, gasoline, and diesel) pass through the East County. Chevron Pipe Line Company, Standard Oil Company, Getty Oil Company, and Unocal Corporation operate a total of five oil pipelines crossing the northeastern corner of the County. These pipelines vary in diameter from 12 to 20 inches. PG&E operates several natural gas pipelines throughout the East County, ranging in diameter from 16 to 36 inches. The STANPAC natural gas pipeline, which is 26 inches in diameter, is located in the northeast corner of the County. Standard Oil Company's 6-inch product pipeline traverses the northeast corner of the County. Chevron Pipe Line Company's 8-inch product pipeline runs diagonally from the northeast corner of the County, to the South of Livermore, and through the southwestern portion of the planning area. Santa Fe Pacific Partners, L.P. has two product pipelines crossing the East County: an



8-inch pipeline running northeast to southwest; and a 10-inch pipeline curving through Dublin and Pleasanton. Figure 27 shows the approximate locations of these pipelines.

## ■ TRENDS

### **Aviation Activity Will Continue to Increase at the Livermore Municipal Airport**

Aviation activity at the airport increased from about 163,650 annual operations in 1982 to almost 233,000 annual operations in 1991. The number of based aircraft increased from 219 in 1974 to 607 in 1991. These trends are attributable to the strength of the local and regional economy, increase in population and income, and the success of the airport's capital development program in attracting aircraft from a broad geographic area.

Forecasts indicate that the annual number of aircraft operations at the airport will increase from the 1990-91 level of about 232,900 total operations to approximately 420,700 total operations by the year 2011, representing an annual growth rate of about 3 percent.

### **Potential for Changes in the Basic Missions of LLNL and SNLL**

There are no plans to scale back operations at either LLNL or SNLL. In fact, there are plans to expand some of the facilities on the laboratory sites. However, changes in the world political climate have raised the issue of moving the emphasis of LLNL's and SNLL's missions away from nuclear weapons research. Because DOE's mission is established by Congress and the President, any changes in the mission must come from Washington. Thus far no such proposals are before either the Congress or the President. The Secretary of Energy under the Bush administration proposed the reconfiguration of the nation's nuclear weapons complex, which may change the role of LLNL and SNLL. DOE is in the process of preparing a programmatic EIS for the reconfiguration proposal.

## ■ PLANNING ISSUES

### **Land Use Compatibility Issues - Livermore Municipal Airport**

In general, urban development near existing airports poses a dilemma for airports. As population and the economy grow, there is a potential for increased demand for airport-related services. However, due to land pressure, new residents often live in residential areas adjacent to or near the flight paths of airports, thus leading to complaints from residents regarding airport noise and safety issues. In many cases, complaints lead to restrictions on the operations of airports and aircraft, and sometimes to closure of the airport.

The Livermore Municipal Airport is a valuable economic resource in the Tri-Valley area and the greater Bay Area. The airport supports the local economy by providing a base for corporate aircraft for major businesses in the Tri-Valley area. It also serves as a base for aircraft operated



by Lawrence Livermore National Laboratory (LLNL) and as an important flight training facility in the Bay Area. In addition to its importance to the local and regional economies, and its importance as a pilot training facility, the Livermore Airport represents a significant financial investment in land and facilities by the federal government and the City of Livermore. The current estimated replacement value of the airport is \$104 million.

The major issue facing Livermore Municipal Airport is protecting the airport from encroachment of incompatible land uses. Although Livermore Municipal Airport is located entirely within the city limits of Livermore, much of the land within the general vicinity of the airport to the north, west and south is undeveloped and unincorporated. The City of Livermore does not have direct control over these lands; therefore, the potential for siting of incompatible land uses near or in the general vicinity of the airport cannot be controlled by the City of Livermore. In 1991, the Livermore City Council amended the City's General Plan to include an airport protection area (APA). The airport protection area is defined as "a zone around the airport where new residential developments are prohibited in order to protect the airport." The airport protection area would also prohibit the intensification of existing residential development within the APA. Because the City's General Plan applies only to the area within Livermore's city limits, the City of Livermore requested that the Alameda County Airport Land Use Commission (ALUC) adopt the airport protection area as land use policy in the *Alameda County Airport Land Use Policy Plan*, so that the APA could be applied to lands outside the City of Livermore's jurisdiction. The ALUC adopted Livermore's APA on January 13, 1993.

#### **Land Use Compatibility - Federal Communications Commission Monitoring Station**

There is the potential for land use incompatibility problems between the FCC monitoring station and future urban land uses in the vicinity of the station. Certain types of land uses may interfere with the operations of the station if they are located in close proximity to the station. Interference with the long-range direction finder is of primary concern. Site distance requirements are established by the FCC and the International Radio Consultative Committee (CCIR). The types of land uses affected by the site distance requirements include metal fences, rail lines, large metal structures, such as water towers; vertical metal structures, such as light standards; buried metal pipes or electrical cables; and large bodies of water, including irrigation and drainage ditches, ponds, small creeks, and intermittent streams. Distance requirements vary depending on the type of land use or structure. The height of metal structures may not exceed two degrees vertical angle as viewed from ground level in the center of the direction finder. The height of all other structures may not exceed three degrees vertical angle.

High density residential and industrial development may be incompatible with the operations of the monitoring station within a one mile radius of the station due to potential electromagnetic interference with the monitoring station's equipment. Major public roadways (four-lanes or more) through or near the monitoring station could result in interference problems. Another concern is the potential for development to change the ground conductivity in the area surrounding the station.

Relocation of the monitoring station is probably not a feasible option due to high costs of relocation and the difficulty in finding a replacement site in this area which could meet the

FCC's very specific site requirements. If a relocation site could be identified, funding for relocation would be the responsibility of future developers of the site. In 1983, this amount was estimated to be about 2.5 million dollars. A similar monitoring station was moved from Fort Lauderdale to Vero Beach, Florida in 1987 at a cost of over \$5 million.

Because the effect of interference with the station's equipment is incremental and cumulative, the measure of "incompatibility" is relative rather than absolute. For any development proposed for the North Valley subarea, coordination with the FCC should be required to more precisely determine and define necessary measures to minimize any potential adverse interaction between the station and the proposed land uses.

Because only transmitting antennas cause interference with television and radio reception, it is significant that the station's antennas are primarily receiving antennas. The few transmitting antennas at the station are currently used for no more than a few minutes each week to ensure their availability in case of a national emergency. Potential interference with TV and radio reception on land adjacent to the station, although minimal, could probably only be mitigated by deed or rental disclosures.

#### **Potential Health Hazard - Federal Communications Commission Monitoring Station**

While transmitting, the four rhombic antennas--which transmit less than five minutes per week--emit high-frequency radio frequency (RF) radiation. RF radiation is one of several types of electromagnetic field radiation. High intensities of RF radiation may be harmful under certain circumstances due to the ability of RF energy to heat biological tissue rapidly. The electromagnetic frequency of RF radiation is also important in determining the relative hazard. There is disagreement, however, over exactly what levels of RF radiation are "safe," particularly with regard to low levels of exposure. There is currently no official federal standard for exposure of the general public to RF radiation. The FCC now uses the protection guidelines of the American National Standards Institute (ANSI), a non-governmental organization that develops recommended standards for a variety of applications, for purposes of evaluating environmental impact from the RF transmitters it regulates. The Environmental Protection Agency (EPA) and the U.S. Air Force are among the federal government agencies that are actively involved in researching the biological effects of RF radiation.

Ground-level intensities of the RF electromagnetic fields resulting from broadcast transmissions depend on several factors, including the type of station, design characteristics of the antenna being used, power transmitted to the antenna, height of the antenna, and distance from the antenna. Calculations can be performed to predict what field intensity levels would exist at various distances from an antenna. Since energy at some frequencies is absorbed by the human body more readily than energy at other frequencies, the existence of a possible hazard would depend on the frequency of the transmitted signal as well as the intensity.

Public access to broadcasting antennas is normally restricted so that individuals cannot be exposed to high-level fields that might exist near an antenna. Measurements made by the Environmental Protection Agency and others have shown that RF radiation levels in inhabited areas near broadcasting facilities are generally well below levels believed to be hazardous.



There have been a few situations around the country where exposure levels have been found to be higher than those recommended by applicable safety standards, but such cases are relatively rare, and few members of the general public are likely to be routinely exposed to excessive levels of RF radiation from broadcast towers.

Although potential health impacts from the FCC station appear to be minimal (given that most of the activity at the station consists of the receiving rather than the transmitting of radio signals), assessment of the relative health hazard to future residents of the area should be addressed before any development adjacent to the FCC station is approved.

### **Land Use Compatibility - Major Research Facilities**

The nature of some of the activities conducted at LLNL and SNLL and substances used in these activities cause concern among the public and raise the issue of potential incompatibility with land uses that may be sited near these facilities. In August, 1992, DOE completed the *Final EIS/EIR for the Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore*. This document analyzed the potential environmental impacts of the continued operation of LLNL and SNLL and near-term (within 5 to 10 years) proposed projects. According to this document, the maximum individual carcinogenic risk attributable to toxic air contaminant emissions from both LLNL and SNLL at current operating levels (and with proposed expansions) is well below the level that the Bay Area Air Quality Management District has designated as the level of concern. Under current conditions, the maximum individual dose of radiation that might occur offsite (at the property line) from normal operations is estimated to be below background level. Proposed changes in operations would actually lower radiation emissions from the Laboratories.

The LLNL Livermore site and the LLNL Site 300 are on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) national Priorities List (Superfund). Cleanup of these sites is underway.

### **Potential Health Hazard - Electric Powerlines and Substations**

The potential health hazard from electromagnetic fields generated by electric powerlines and substations is discussed in detail in the *Electromagnetic Fields* background report in Section F.

## **■ POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Compatibility between new land uses and existing major public facilities*
- *Location of new major public facilities*



- *Expansion of existing major public facilities*

*Livermore Municipal Airport*

- *Recognition of the Livermore Municipal Airport as a regional resource*
- *Expansion of the Airport*
- *Consistency of new uses within the ALUC referral area with the ALUC Policy Plan*
- *Mitigation of conflicts between new uses and the airport by the new uses*

**Sources:**

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




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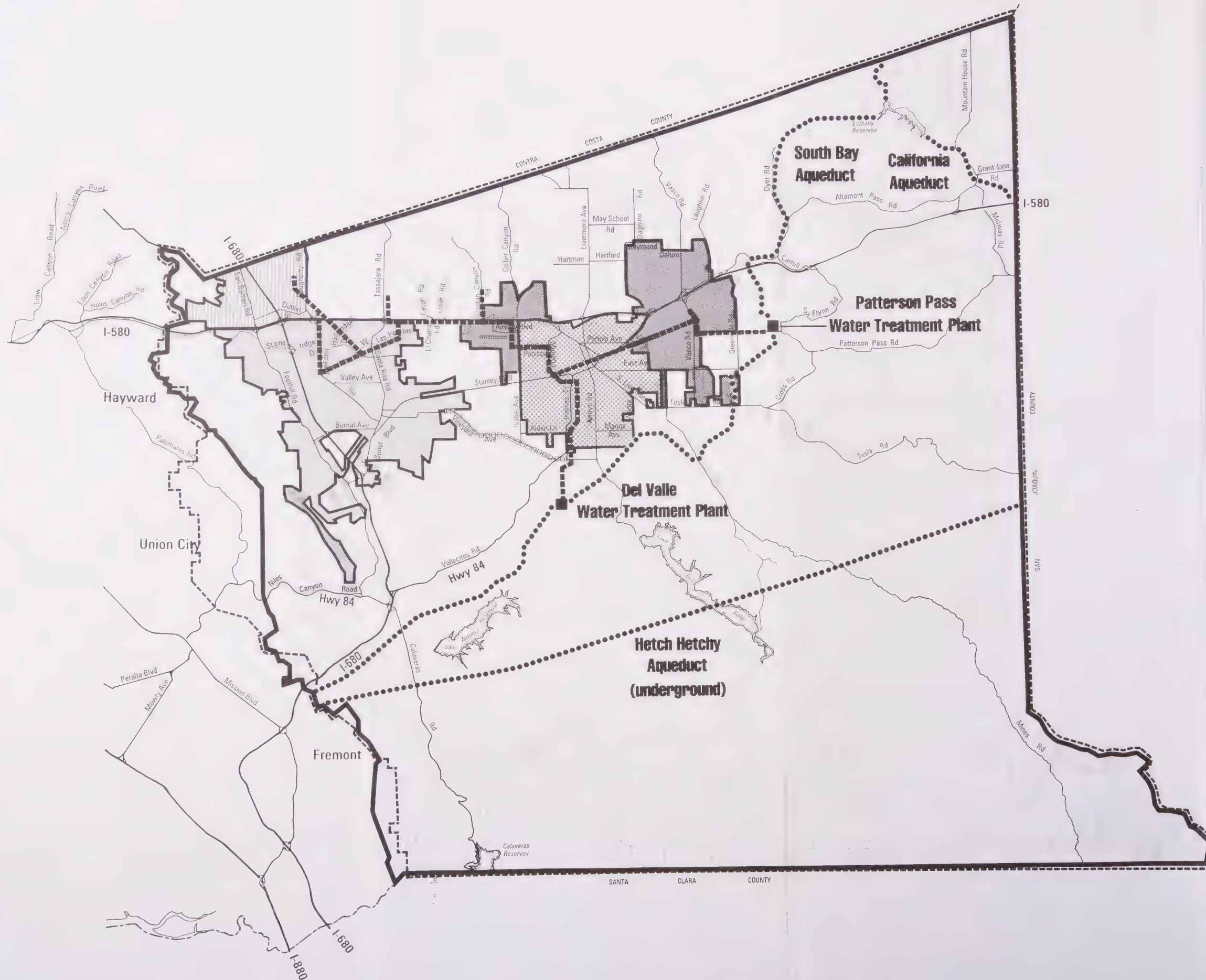


# Water District Boundaries

## LEGEND

-  California Water Service Company Area
-  City of Livermore Water Service Area
-  City of Pleasanton Water Service Area
-  DSRSD Water Service Area
-  Treatment Plant
-  Aqueduct
-  Water Transmission Lines
-  Zone 7 Service Boundary
-  Proposed Water Transmission Line

**NOTE:** The Zone 7 Service Boundary and the Planning Area Boundary coincide except where illustrated.



SOURCE: Alameda County Planning Department

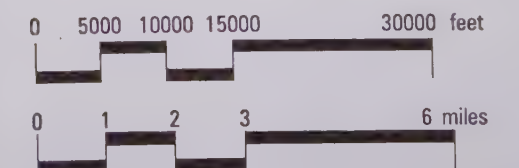











FIG. 19







### LEGEND

- |   |   |
|---|---|
|    | City of Livermore Sewage Treatment Area         |
|    | City of Pleasanton Sewage Treatment Area        |
|    | DSRSD Sewage Treatment Area                     |
|    | G.E. Vallecitos Sewage Treatment Area           |
|    | VA Hospital Sewage Treatment Area               |
|    | LAVWMA Export Pipeline                          |
|    | Pump Station                                    |
|  | Treatment/Reclamation Plant                     |
|  | Proposed Tri-Valley Wastewater Authority System |

SOURCE: Alameda County Planning Department

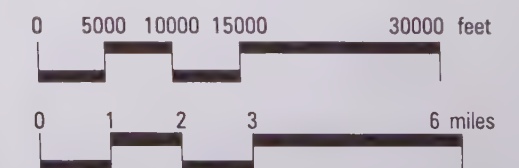






FIG. 20

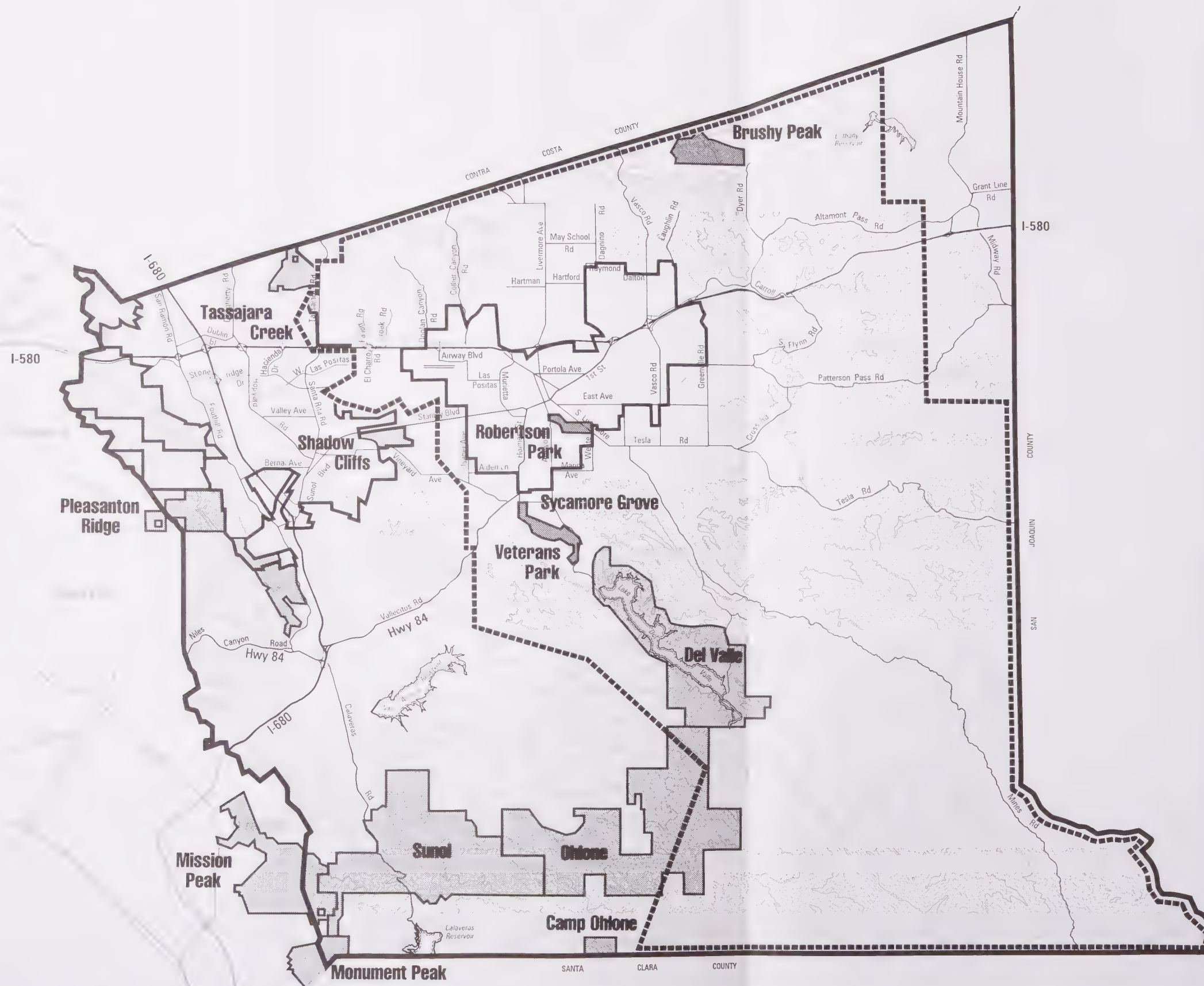


# Park District Boundaries

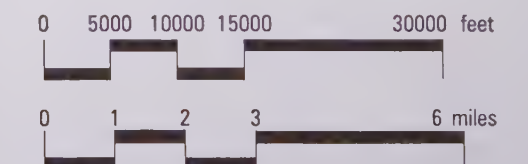
## LEGEND

-  East Bay Regional Park District Lands
-  Livermore Area Recreation and Park District Lands
-  LARPD Existing Major Parks
-  EBRPD Existing Major Parks

**NOTE:** East Bay Regional Park District jurisdiction extends over entire planning area.



SOURCE: *Regional Parkland & Trail Map*, EBRPD 1989  
*Regional Trail Plan*, LARPD 1991



**FIG. 21**











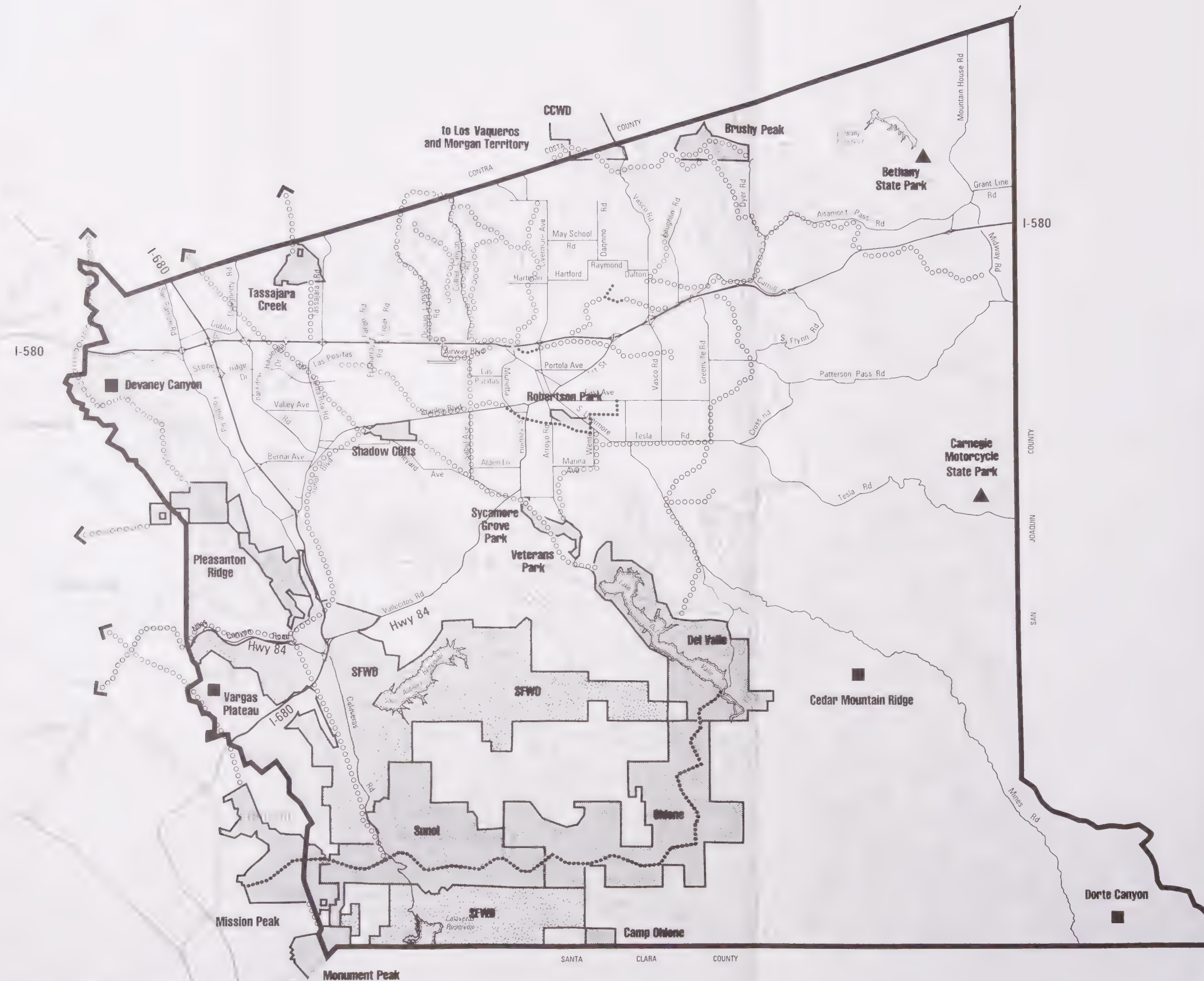


# Major Park Facilities and Regional Trails

## LEGEND

-  Existing Major Parks
-  Existing State Parks
-  Potential Park Sites
-  Existing Regional Trails
-  Proposed Regional Trails
-  Watershed Lands

NOTE: San Francisco Watershed Lands are not currently accessible to the public, but may be in the future.



SOURCE: *Regional Parkland & Trail Map*, EBRPD 1989  
*Regional Trail Plan*, LARPD 1991

0 5000 10000 15000 30000 feet

0 1 2 3 6 miles






FIG. 22



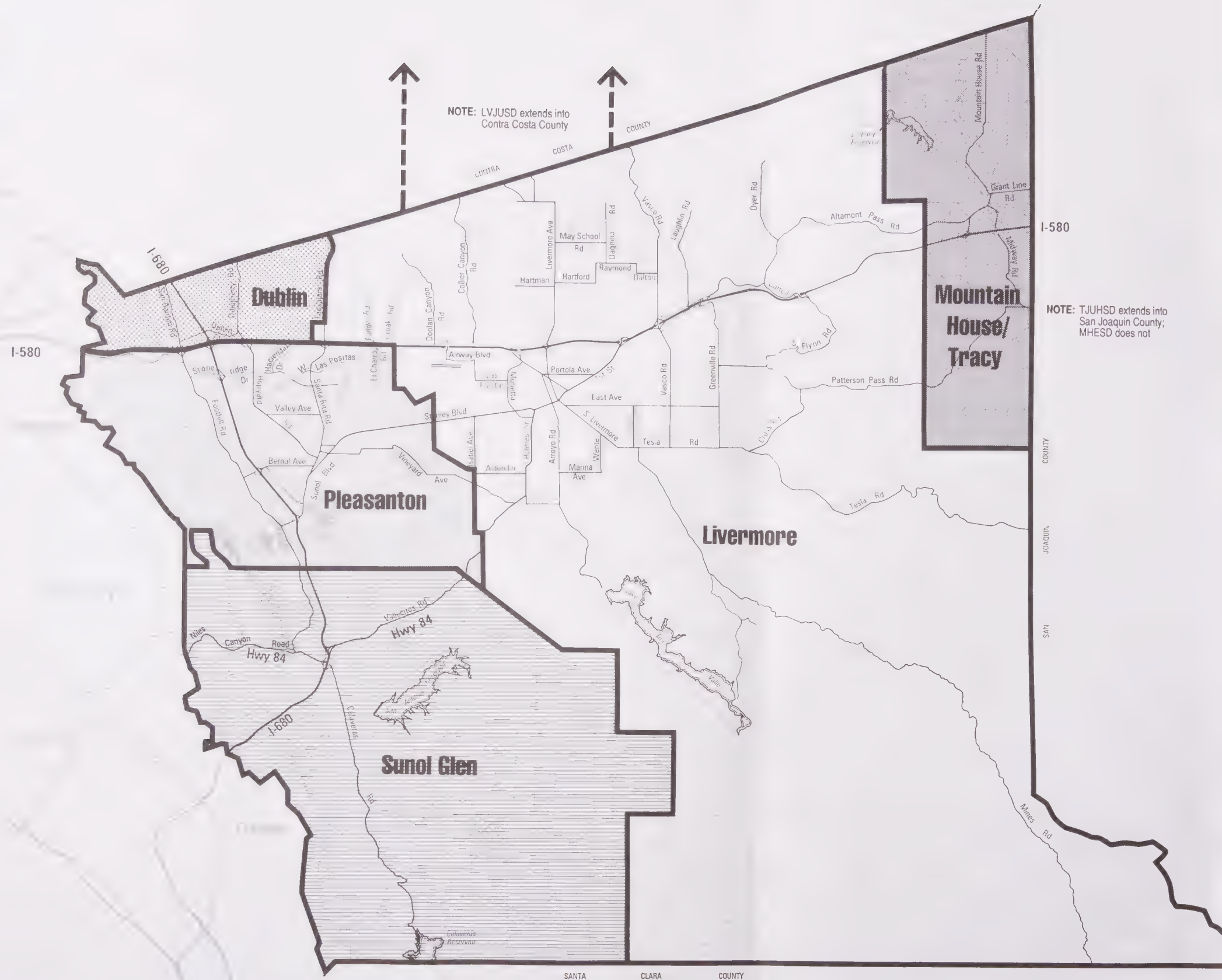


# School District Boundaries

## LEGEND

-  Dublin Unified School District (DUSD)
-  Livermore Valley Joint Unified School District (LVJUSD)
-  Mountain House Elementary School District (MHESD)/Tracy Joint Union High School District (TJUHSD)
-  Pleasanton Unified School District (PUSD)
-  Sunol Glen School District (SGSD)

NOTE: Pleasanton U.S.D. provides secondary education.



SOURCE: Alameda County Planning Department

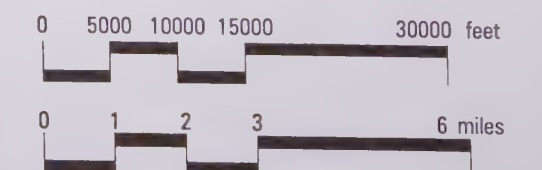


FIG. 23







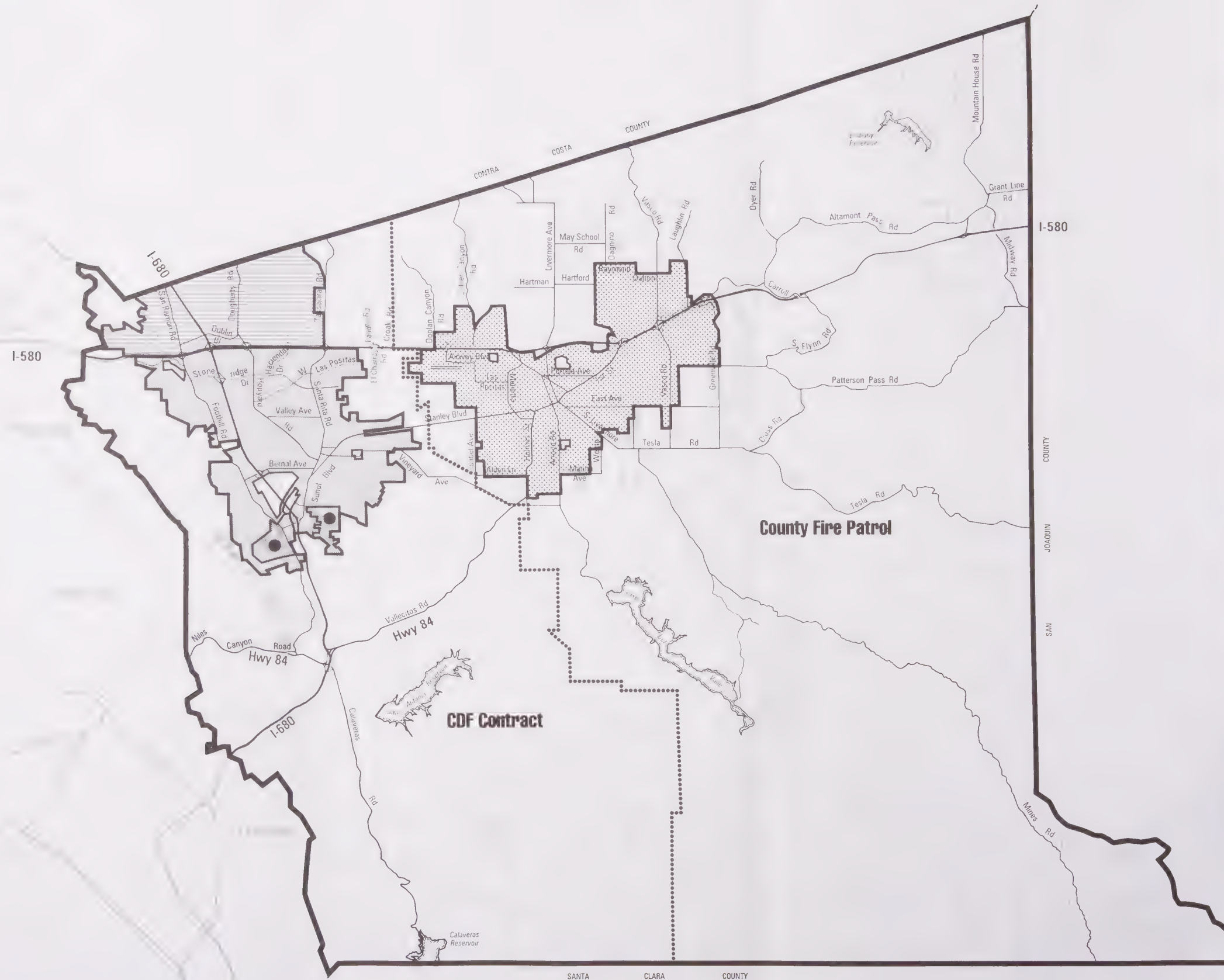




# Fire District Boundaries

## LEGEND

-  Dougherty Regional Fire Authority Area
-  City of Livermore Fire Department
-  City of Pleasanton Fire Department
-  Service Contract with Pleasanton Fire Department



SOURCE: Alameda County Planning Department

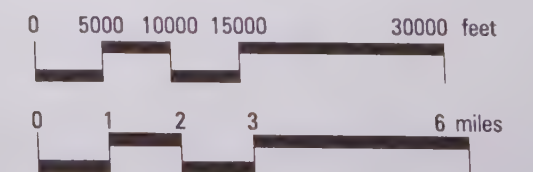


FIG. 24



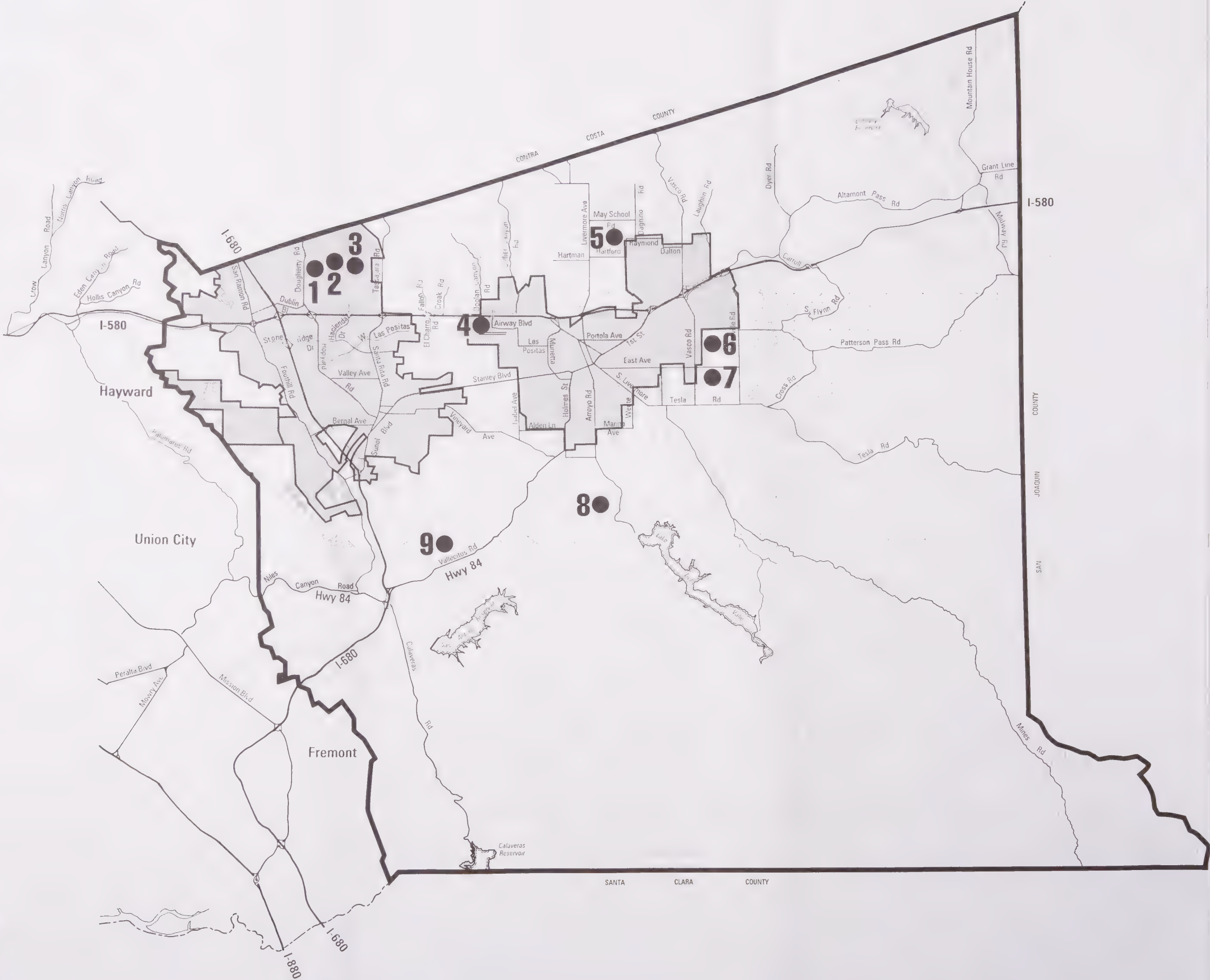




# Major Public Facilities

## LEGEND

- 1. Camp Parks, U.S. Army
- 2. Federal Correctional Facility, Pleasanton
- 3. Santa Rita Jail
- 4. Livermore Municipal Airport
- 5. FCC Monitoring Station
- 6. Lawrence Livermore National Laboratories
- 7. Sandia National Laboratories
- 8. U.S. Veterans Hospital
- 9. General Electric Vallecitos



SOURCE: Alameda County Planning Department

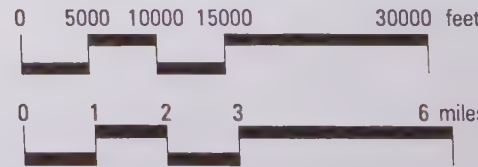







FIG. 25

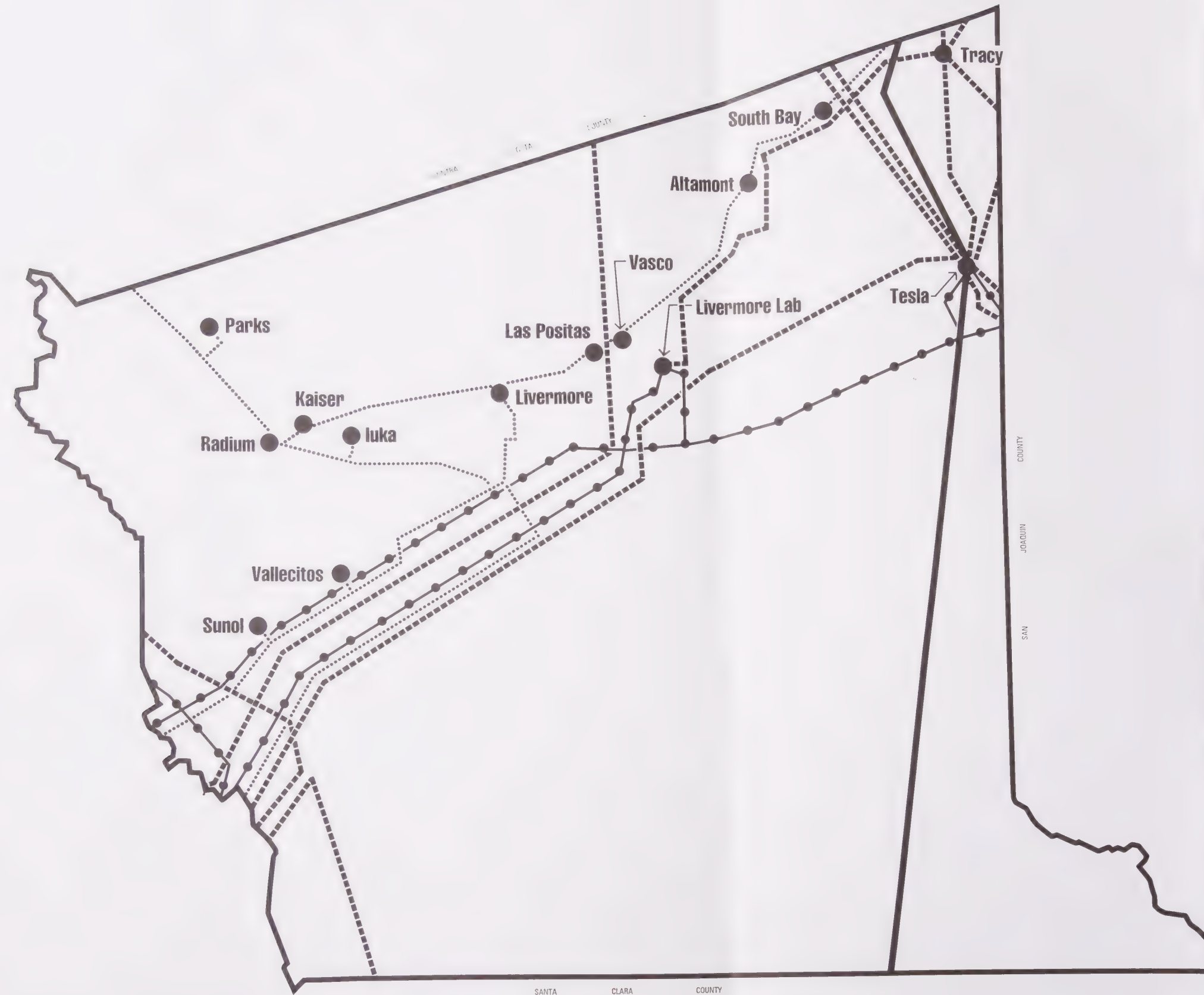


# Major Electrical Facilities

## LEGEND

-  500 Kilovolts
-  230 Kilovolts
-  115 Kilovolts
-  69 Kilovolts
-  Substations

NOTE: Locations are approximate.



SOURCE: Draft Final Report, Energy Siting Report of the Energy Element for Alameda County, EBASCO Environmental, June 1992

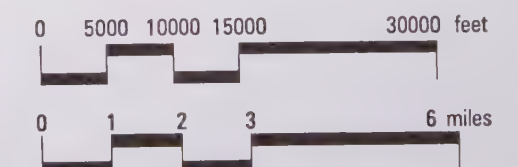


FIG. 26



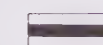





# EAST COUNTY AREA PLAN (DRAFT)

## Major Pipelines

### LEGEND

 Natural Gas

 Oil

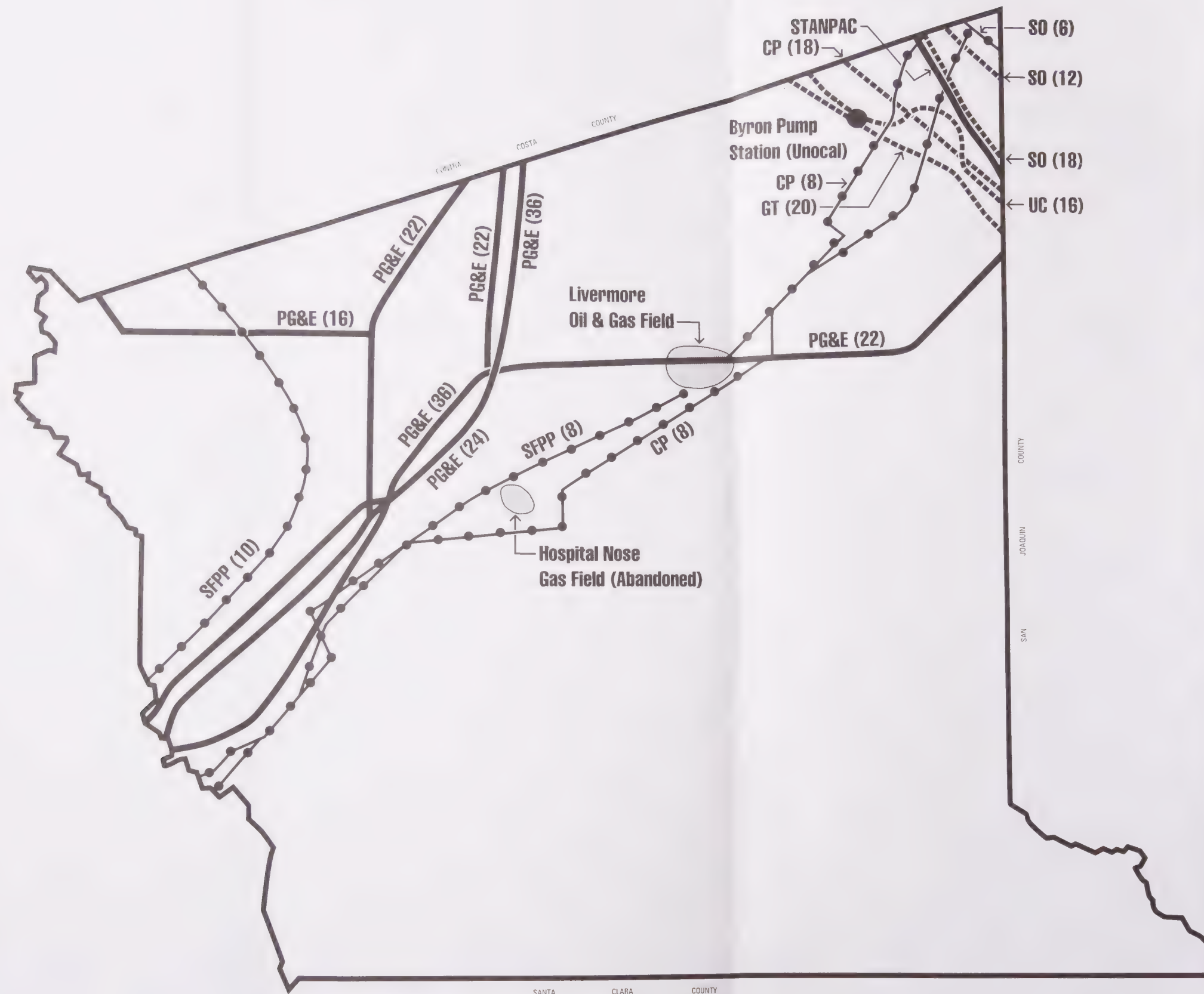
 Product

**(6)** Maximum Diameter in Inches

### OWNERS

CP Chevron Pipeline Company  
 GT Getty Oil Company  
 PG&E Pacific Gas & Electric  
 SFPP Santa Fe Pacific Pipeline Partners, L.P.  
 SH Shell Oil Company  
 SO Standard Oil Company  
 UC Unocal Corporation

NOTE: Locations are approximate.



SOURCE: Draft Final Report, Energy Siting Report of the  
 Energy Element for Alameda County,  
 EBASCO Environmental, June 1992

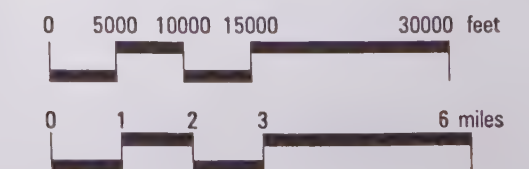


FIG. 27



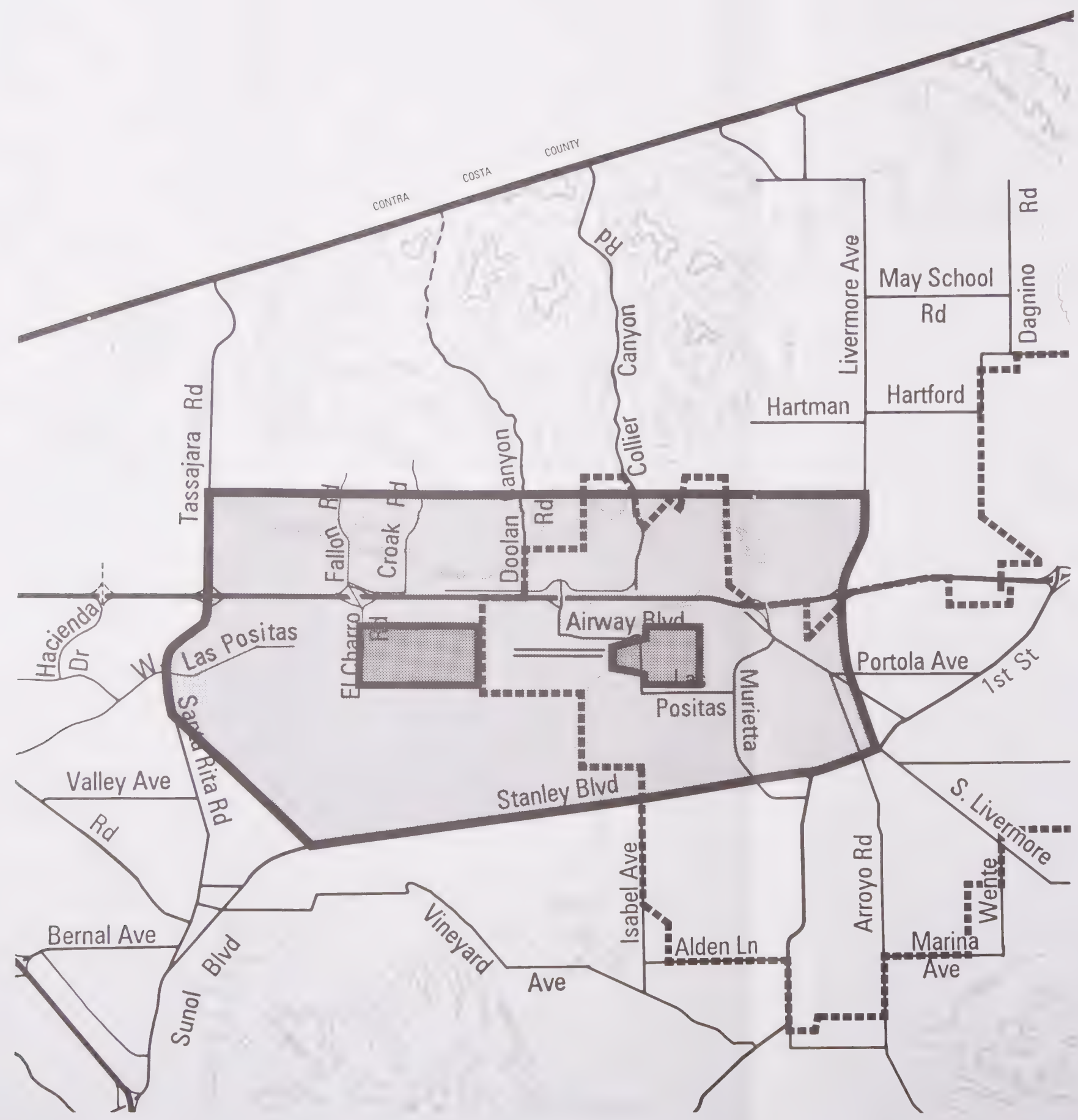




# ALUC General Referral Area & Safety Zones

## LEGEND

- ALUC General Referral Area
- Safety Zones
- Livermore City Limit



SOURCE: Alameda County Airport Land Use Policy Plan, Airport Land Use Commission of Alameda County, July 1986

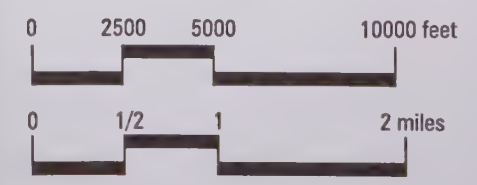




FIG. 28

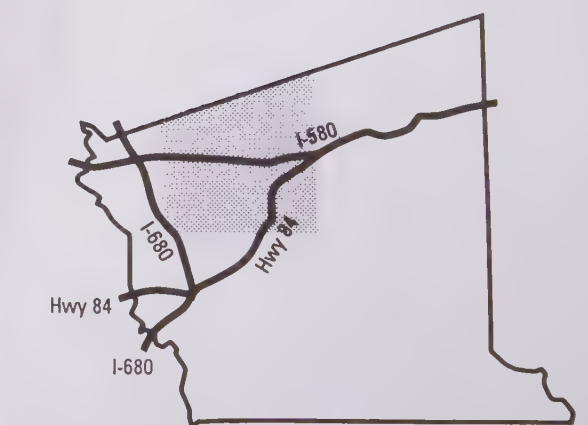


# ALUC Height Referral Area

## LEGEND

-  Livermore Municipal Airport Runways
-  Livermore City Limit

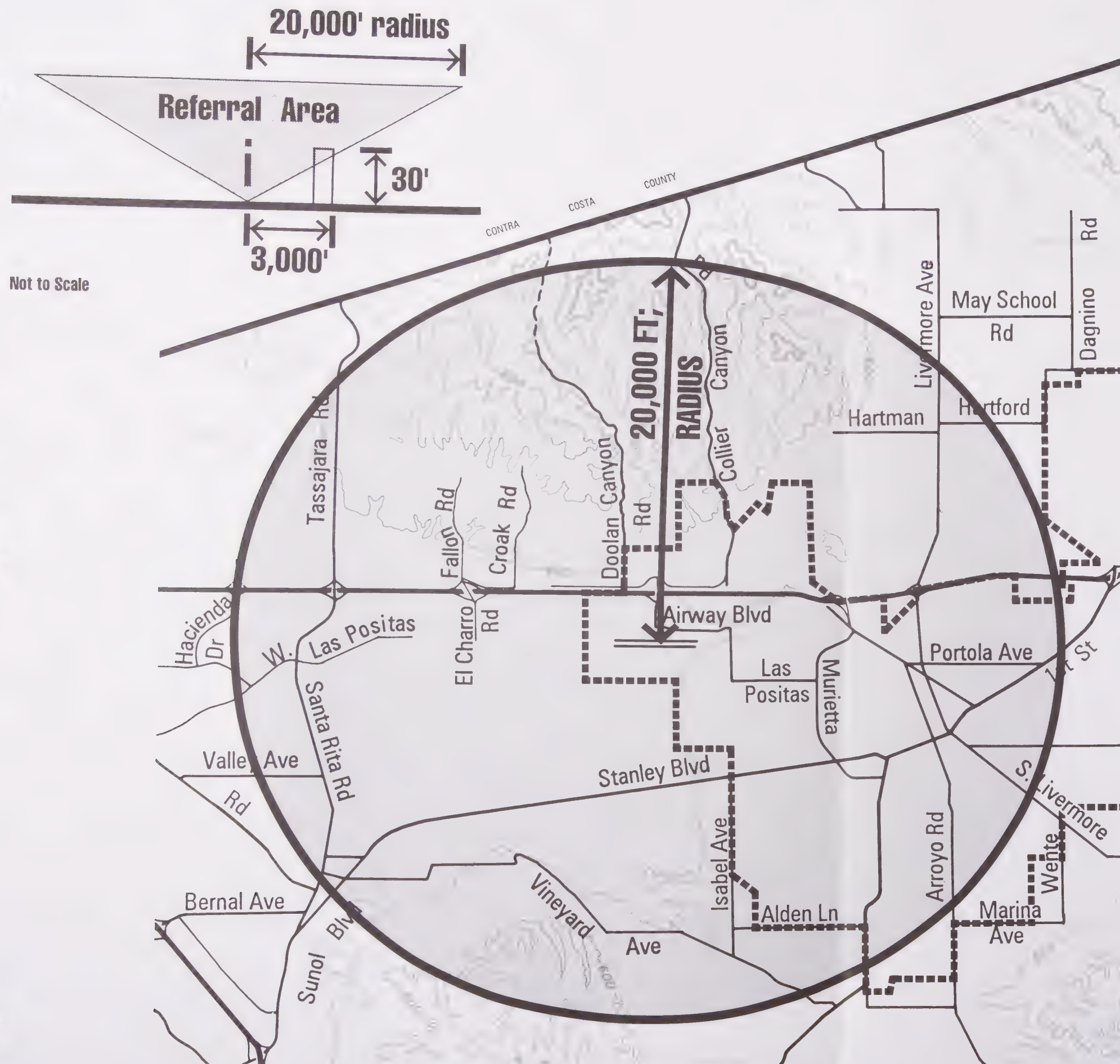
NOTE: The ALUC height referral area is three-dimensional and conical in shape. The horizontal dimension is a 20,000 foot radius as shown on the map. The vertical dimension is measured by the following formula: for each 100 feet horizontally measured from the runway to the closest point of the structure, measure one foot in height. If a structure exceeds this height, then it must be referred to the ALUC. For example, if a building were 3,000 feet from the runway, the building would have to be referred to the ALUC if it exceeded 30 feet in height. The ALUC also requires referral for any structure that protrudes into the airspace 200 feet above ground level anywhere in Alameda County.



SOURCE: Alameda County Airport Land Use Policy Plan, Airport Land Use Commission of Alameda County, July 1986



FIG. 29



Not to Scale





## Section E. Environmental Quality and Resources



## Geology

### ■ INTRODUCTION

This report examines geomorphology, soils, and mineral resources in the East County. The planning area is separated from the San Francisco Bay Plain by the East Bay Hills, and extends eastward to the western boundary of San Joaquin County. The East Bay Hills and other hills of eastern Alameda County are part of the Diablo Range, which in turn is part of the Coast Range. The Diablo Range consists of a series of ridges which run in a northwesterly to southeasterly direction. Narrow, steep-sided valleys and canyons are interspersed throughout the ridge system.

The overall physiography described above is not unique to this portion of the Pacific Coast; the basic topography--rolling to steep mountains separated by creek or river valleys--is typical of many locations in the Coast Range. The rugged profile of the landscape is primarily a function of tectonics (specifically, the effects of the fault lines that lie on the North American/Pacific Plate boundary); the action of running water has been a secondary force contributing to the area's surface features.

The valley areas of the planning area are underlain by Quaternary, unconsolidated deposits of up to three million years in age. These deposits consist of alluvial sediments which contain stream-deposited sand, gravels, silts, clays and intermixtures. The Quaternary is, in turn, underlain by sedimentary metamorphic and igneous rocks of up to 150 million years in age. Bedrock of various ages and types underlie the East Bay hills and the those of the Diablo Range. Almost all of the hills have a mantle of topsoil and weathered bedrock; the soil materials vary in depth from a few feet to many feet.

### ■ EXISTING CONDITIONS

#### Physical Setting

Soils. Soils are the materials that make up the earth's surface; they consist of mineral and organic matter and are created through physical, chemical and biological processes. The Soil Conservation Service (SCS) of the United States Department of Agriculture prepares soil surveys which classify soil characteristics and their suitability for agriculture and development. Each soil association has a distinct pattern of soils; the differences between soil associations are relevant both to agriculture and to development potential. Individual soil types can exhibit a range of physical characteristics depending upon the location or slope upon which they are found.

The primary soil landscape groupings for the planning area are *upland soils* and *soils of the terraces, alluvial fans, and flood plains*. The SCS has surveyed and identified seven soil



associations for the eastern portion of Alameda County, and classified them in relation to landscape characteristics (the boundaries of the survey go slightly beyond the bounds of the planning area on its western edge). The geographic placement of these associations is shown in Figure 30; the central characteristics of each association are summarized in Table E-1.

The *soils of the terraces, alluvial fans and floodplains* consist of four soil associations: Yolo-Pleasanton, Positas-Perkins, Clear Lake-Sunnyvale, and Rincon-San Ysidro. These associations account for 28 percent of the SCS survey area, and include most of the agricultural and urban land uses. The discussion which follows summarizes the primary physical characteristics of the soils:

- o The **Yolo-Pleasanton Association** is found in the valley area near Pleasanton and Livermore. The topography of the area is level, with a few sloping escarpments on the low terraces; the elevations range from 220 to 880 feet. Yolo-Pleasanton soils are the most intensively cultivated in the planning area (well water is available for irrigation in much of the area). Land in the Pleasanton and Sunol areas is suitable for irrigated pasture, row crops, roses and walnuts. Vineyards are primarily limited to the gravelly soils located south of Livermore. Dry-farmed grain and grain hay are the major crops in the areas where irrigation water is not available.
- o The **Positas-Perkins Association** is found on the terraces south of the Livermore Valley. The topography ranges from sloping to very steep, with elevations ranging from 300 to 1,500 feet. The Positas-Perkins association consists of Diablo clays, and Positas, Shedd, Azule and Perkins soils. Agricultural uses consist of grazing and the growing of grain and grain hay.
- o The **Clear Lake-Sunnyvale Association** is found in the basin areas and low terraces east of Dublin. The topography is nearly level, with some moderate sloping on terraces; the elevations range from 100 to 900 feet. The association is comprised of the Clear Lake, Sunnyvale, Pescadero and Danville soils. These soils are primarily used to grow grain and grain hay.
- o The **Rincon-San Ysidro Association** is found in the northeast corner of the County and in the east end of the Livermore Valley. The topography is characterized by nearly level or gently sloping fans and flood plains, with elevations ranging from five to 125 feet in the northeast corner of the County and 500 to 600 feet in the eastern Livermore Valley. The association consists primarily of Rincon, San Ysidro and, to a lesser degree, Solano soils. Intensive agriculture is limited to the Rincon, the major crops being irrigated alfalfa, sudan, sugar beets, corn, pasture crops, grain and tomatoes. Crop yields on San Ysidro and Solano soils are low.

The *upland soils* category covers about 72 percent of the SCS survey area. It consists of three soil associations--Altamont-Diablo, Vallecitos-Parrish, and Millsholm-Los Gatos-Los Osos--which are described in detail below:

- o The **Altamont-Diablo Association** is found in the upland areas north and east of the Livermore Valley. The area is characterized by smooth round hills and rolling to steep topography, with particularly steep slopes along streams. The hills range in height from 700 to 1700 feet. The area is limited to dry farming and grazing due to hilly topography, low rainfall and lack of irrigation water.
- o The **Vallecitos-Parrish Association** is located in the southeastern section of the planning area. The region is characterized by steep, mountainous terrain and frequent outcroppings of bedrock, with elevations from 1,000 to 3,800 feet. North-facing slopes are heavily wooded, with an understory of annual and perennial grasses. Vegetation elsewhere consists of annual grasses and oaks. The association consists primarily of Vallecitos, Parrish, Henneke, Livermore and Pleasanton soils, which are used for grazing due to their shallowness. Forage yields are low to moderate.
- o The **Millsholm-Los Gatos-Los Osos Association** is located in the western uplands area, extending from the Calaveras Reservoir to the Upper San Leandro Reservoir. The topography of the area is steep to very steep, with elevations ranging from 600 to 2,500 feet. The association consists primarily of Millsholm, Los Osos, Los Gatos, and Gaviota soils; Lobitos, Danville, Yolo and Los Osos seeped variant soils are also present, to lesser degree. Farming is limited to pasture and range because of low rainfall, steep topography and lack of water. This association makes up about thirty percent of the Upland soils group.

**Prime Agricultural Soils.** The agricultural value of soils depends upon factors such as adequate moisture, acidity, chemistry, depth, erosion, permeability and texture. There are different rating systems used to identify "prime" agricultural soils; the definition of "prime" varies among the rating systems, but generally refers to the best land for producing food, feed, fiber, forage and oil-seed crops. (see the *Agriculture* background report in Section A for more information regarding agricultural soils and related land uses)

**Septic Limitations.** Most areas in the East County have significant septic limitations, owing to the drainage and percolation qualities of the soil, as well as soil chemistry. Only a few soil types, such as the Yolo and Livermore series, are well-suited for septic leachfield processing. The septic limitations are not problematic in urban areas, where sanitary sewage processing is provided, or on large parcel building sites where the quantity of soil available for leach processing compensates for the relatively low leach capability. However, septic limitations can be a problem on non-urban building sites of approximately five acres or less. Areas with limited septic capabilities (i.e., those where small parcel development could result in environmental degradation) include the Road/Tesla Road corridor, the Mountain House area, Sunol, and the Dougherty Hills (East Dublin sub-area).

**Mineral Resources.** Alameda County contains one of three major production districts for Portland Concrete cement-grade sand and gravel in the San Francisco-Monterey Bay Area. The production district in Alameda County is the Livermore-Sunol Valley-Niles Cone area, and is the primary source of aggregate--sand, gravel and crushed stone materials used for construction purposes--for the South San Francisco Bay Production-Consumption Region. The production-consumption region consists of Alameda, Contra Costa, San Mateo, San Francisco



TABLE E-1

## Soil Associations Of The East County

Soil Type	Land, Class	Agriculture	Permeability (inch/hour)	Shrink-Swell	Erosion Hazards	Septic Limitation
<b>Yolo-Pleasanton Association, gentle slopes</b>						
Livermore	IV	Good	5-10	Low	Slight	Slight
Sycamore	I, II	Very Good	0.8-2.5	Low	Slight	Severe
Pleasanton	II, III	Very Good	0.8-2.5	Low - Moderate	Slight - Moderate	Severe
Yolo	I	Very Good	0.8-2.5	Low	Slight	Slight
Zamora	I	Very Good	0.2-0.8	Moderate - High	Slight	Severe
<b>Clear Lake-Sunnyvale, gentle slopes</b>						
Clear Lake	III	Good/Very Good	0.05-0.2	High	Slight	Severe
Sunnyvale	I, II	Very Good	0.2-2.5	Moderate	Slight - Moderate	Severe
Pescadero	VI	Very Poor	0.05-0.5	Moderate - High	Slight	Severe
Danville	II	Very Good	0.05-0.2	Moderate - High	Slight	Severe
<b>Rincon-San Ysidro, gentle slopes</b>						
Rincon	II, III	Very Good	0.05-0.2	High	Slight - Moderate	Severe
San Ysidro	IV	Fair/Good	0.8-2.5	Low	Slight	Severe
Solano	IV	Very Poor	0.5-0.8	High	None	Severe
<b>Positas-Perkins, gentle to very steep slopes</b>						
Positas	III - VII	Fair	<0.05-2.5	Low - High	Slight - Very Severe	Severe
Shedd	IV - VII	Fair/Very Good	0.8-2.5	Low	Moderate - Very Severe	Severe
Perkins	IV - VII	Fair	0.2-2.5	Low - Moderate	Slight - Very Severe	Severe
Azule	IV - VII	Good/Very Good	0.05-0.2	High	Slight - Very Severe	Severe
<b>Altamont-Diablo, gentle to steep slopes</b>						
Altamont	IV, VI	Fair to Very Poor	0.05-0.2	High	Moderate - Severe	Severe
Linne	IV, VI	Very Poor	0.2-0.8	Low	Slight - Very Severe	Severe
Diablo Clays	III - VII	Good/Very Good	0.05-0.2	Moderate - High	Slight - Very Severe	Severe
<b>Vallecitos-Parrish, steep to very steep slopes</b>						
Vallecitos	VI, VII	Fair/Good	0.2-2.5	Low	Severe	Severe
Parrish	VI, VII	Good/Very Good	0.8-2.5	Low - Moderate	Severe	Severe
Henneke	VIII	Very Poor	0.8-2.5	Low	Severe	Severe
<b>Millsholm-Los Gatos-Los Osos, steep to very steep slopes</b>						
Millsholm	VI, VII	Fair/Good	0.8-2.5	Moderate	Severe	Severe
Los Osos	III-VII	Very Good	0.2-0.8	Moderate	Slight - Severe	Severe
Los Gatos	VI, VII	Good/Very Good	0.8-2.5	Low	Severe - Very Severe	Severe
Gaviota	VII	Fair/Good	2.5-5.0	Low	Slight - Severe	Severe
Lobitos	VI	Good	0.8-2.5	Low	Moderate - Severe	Severe

Source: U.S.D.A., Soil Conservation Service, 1966



and Santa Clara Counties, an area which totals 2,360 square miles. Aggregate is also imported from the Monterey region.

The State Mining and Geology Board has designated portions of the East County as Regionally Significant Construction Aggregate Resource Areas. These areas are mineral resource zones which are known or suspected to contain construction-grade sand and gravel deposits. There are five areas within the planning area which are designated as construction aggregate deposits of regional significance; all are described below. Figure 31 shows the location of the resource sectors within the East County.

- **Sector A.** Aggregate deposits located in the Livermore and Amador Valleys in the Cities of Pleasanton and Livermore. Major operators: Kaiser Sand & Gravel, the Jamieson Company, and RMC Lonestar, Inc. Data concerning total resources in this area are not available because the operators consider it proprietary information.
- **Sector B.** Alluvial deposit consisting of six parcels along Arroyo del Valle on the southwestern edge of the City of Livermore. These six parcels are under various ownership and none are owned by sand and gravel operators. This deposit contains approximately 88 million tons of resource.
- **Sector C.** Alluvial deposit consisting of six parcels located along Arroyo Mocho on the eastern edge of Livermore. None of the parcels has active surface mining permits; one is an active vineyard. The deposit contains approximately 99 million tons of resource.
- **Sector D.** Greenstone deposit on Apperson Ridge east of Sunol Valley. Part of the area is covered by Surface Mining Permit and Reclamation Plan SMP-17; activity under this permit has not yet commenced. Total resource available is approximately 1,040 million tons.
- **Sector E.** Alluvial deposit consisting of five parcels in Sunol Valley. Sand and gravel operators are Santa Clara Sand and Gravel, Mission Valley Rock Company and RMC Lonestar, Inc. There is a single large parcel not currently under permit in this sector. Approximately 142 million tons of resource are available.

**Other Mineral Deposits.** Several other types of mineral resources have been discovered, and to some extent exploited, in areas near Livermore, the Altamont Hills, and Tesla Road. Clays found in these areas were mined years ago for use in brick, sewer pipe and roofing tile; however, no such mining has occurred since 1912. Extensive deposits remain, but exploitation of these areas has been prevented by the economic exigencies of subsurface mining.

Lignite coal was mined extensively from the Tesla formation between 1897 and 1902. Silica was mined from Tesla Sandstone deposits northwest of Corral Hollow, but the extent of this operation, and its precise location, are no longer known. Other potentially valuable mineral deposits in the area include manganese, chromium, gemstones, pyrite, dimension stone, and natural gas.

**Petroleum Production.** There are a number of individual oil wells scattered throughout the eastern portion of the County (mostly around Livermore) and two major petroleum and gas fields: Hospital Nose Gas Field, several miles south of Livermore, which is now abandoned; and Livermore Oil Field, located east of Livermore, which was discovered in 1967 and continues to operate today. Livermore Oil Field originally included a battery of ten operating wells; that number has since been reduced to five, each of which produces approximately seven barrels of oil daily. Estimated reserves in 1986 amounted to 132,000 barrels; production is declining, and no further exploration is being conducted or proposed in the area. are added to

**Fossils.** Fossils have been found in many of the gravels and unconsolidated rocks in the Livermore Valley, Diablo Range, and Altamont Hills. They include invertebrate and oyster shells, plant fossils, and bone fragments from a variety of mammals (including mammoths, camelids, giant sloths, horses, shrews, beavers and squirrels). The deposits are widely scattered and are not considered to be particularly unique.

**Tesla Geological Area.** This area, located in the Altamont Hills east of Livermore, is considered to be an important geological area by both the County and the City of Livermore. The area's significance stems from the complex geology of the area, the presence of many different minerals and deposits, and the fossils known to exist in its rocks.

**Significant Physical Features.** Mission Peak, Rose Peak and Cedar Mountain all belong to the Diablo range, and are the most prominent peaks in Alameda County. *Mission Peak* is located in Mission Peak Regional Preserve, east of Fremont, and is a prominent visible landmark from Hayward in the north to San Jose in the south (as well as points across San Francisco Bay). Views from the top of Mission Peak encompass much of the Bay Area. Mission Peak itself exceeds 2,500 feet in height; nearby Allison Peak on the same mountain mass, rises to more than 2,650 feet.

*Rose Peak* is a high, moderately-sloped mountain in the south-central region of the County. At 3800 feet it is the highest point in Alameda County--nearly as high as Mount Diablo in Contra Costa County and only a few hundred feet shorter than the Mount Hamilton Group in Santa Clara County (the tallest peaks in the range). Rose Peak is located in the Ohlone Regional Wilderness, a unit of the East Bay Regional Park District. This peak is not generally visible from much of the surrounding area due to its position in the midst of many lower hills and peaks; however, views from the top may, on a clear day, include the Sierra Nevada, the Santa Cruz Mountains and much of the Bay Area and Central Valley.

*Cedar Mountain* is located in the southeastern portion of the planning area near the border of San Joaquin County. Like Rose Peak, it is not particularly visible due to the presence of many surrounding hills and valleys, although it exceeds 3,600 feet in elevation. Cedar Mountain includes private parcels of land, and is largely closed to the public.

The *Livermore and Amador Valleys* are found in the northwest and north-central portions of the planning area; both trend in an east-west direction. The valleys are surrounded by gently rolling



hills on all sides, giving way to steeper hills and slopes in the rural areas. The *Sunol*, *Vallecitos* and *La Costa Valleys* are smaller valleys located in the central-west section of the planning area to the east and northeast of Niles Canyon and Mission Pass. *Niles Canyon* is a narrow, steep-sided canyon west of Sunol which allows passage of Alameda Creek from the Sunol Valley to San Francisco Bay.

Other notable physical features include the *Vargas Plateau*, which lies in the Diablo Range north of Mission Pass, and the *Tesla Geological Area*, a region in the Altamont Hills known for its wide variety of minerals, deposits and fossils. The lowest elevations in the East County (approximately 5 feet above sea level) lie in the extreme eastern portion of the planning area, near Mountain House, where the Altamont Hills descend to the Central Valley. The *Mountain House* area is the only portion of Alameda County to lie substantially within the Great Valley geological province.

**Seismicity.** The East County is located in a region of great seismic activity. The seismicity of a region can be measured by the frequency, distribution, and intensity of earthquakes over a period of time. The earth's crust is composed of numerous rock masses of horizontal extent, called *tectonic plates*, which are in dynamic contact at their edges. Earthquakes are caused when potential energy stored in adjacent masses of rock is released and a relative shift in the positions of the plates ensues.

The resulting rupture along which the displacement of earth occurs is called a *fault*. A *fault line* is a scar on the surface where earth materials have been displaced. The release of energy causes ground motion or ground shaking. The repeated occurrence of earthquakes in the Bay Area is related to the accumulation of stress caused by constant motion occurring at the boundary of the North American and Pacific tectonic plate boundaries (i.e., the region's fault zones).

The *magnitude* of an earthquake is expressed in terms of the amount of energy released at or near the epicenter of the earthquake. The magnitude is measured by seismographs and is expressed as a logarithmic number on the Richter Magnitude Scale. Earthquake *intensity* measures the effects of an earthquake or the severity of ground shaking at any particular location and provides a subjective measure of the effects of earthquakes on people, man-made objects and natural features; it is measured using the *Modified Mercalli* (MM) intensity scale. Table E-2 shows the Modified Mercalli Scale and the Richter Magnitude correlation.

**Classification of Fault Zones.** Faults are classified as "active," "potentially active," "activity uncertain," and "inactive." An active fault is one where there has been some activity within recent geologic time, and there is potential for activity in the near future. A potentially active fault is one in which there has not been a rupture in historic time, but there is geological evidence that a rupture has occurred in the recent geological past and could happen in the future. A fault classified as activity uncertain is one for which there is insufficient data concerning the level of activity or recurrence of activity. An inactive fault is one for which there is no evidence of activity in recent geologic time.

There are a number of active and potentially active faults in the San Francisco Bay region. The San Andreas Fault system, which runs nearly the entire length of California, includes



TABLE E-2

**Comparison of Earthquake Magnitude, Intensity and Effects**

<b>Magnitude (Richter Scale)</b>	<b>Intensity (Modified Mercali Scale)</b>	<b>Effects</b>
1	I	Not Felt; Observed Only Instrumentally.
2	I-II	Can Be Barely Felt Near Epicenter.
3	III	Felt Indoors; Vibration Like Passing of Light Trucks.
4	V	Felt Outdoors; Effects Extend a Few Miles From Epicenter.
5	VI-VII	Felt By All; Some Damage Occurs.
6	VII-VIII	Moderately Destructive; Some Severe Damage.
7	IX-X	Severe, Widespread Destruction.
8	XI	Damage Nearly Total.
<b>Source:</b> Peter Yanev, <u>Peace of Mind in Earthquake Country</u> ; C.F. Richter, <u>Elementary Seismology</u> .		

a number of individual faults in addition to the San Andreas itself. While the San Andreas runs west of San Francisco Bay, three major components of the system--the Greenville, the Calaveras, and Hayward Faults--are found east of the Bay, extending through the East Bay Hills and the Diablo Range.

The Greenville and Calaveras Faults are the two largest faults which actually run through the East County. The Greenville Fault, which is classified as active, traverses the central portion of the planning area in a northwest to southeast direction, generally following the western base of the Altamont Hills. The Calaveras Fault, also considered active, traverses the western portion of the planning area in a southeasterly direction, following the eastern edge of the East Bay Hills. The Hayward Fault, located along the western margin of the East Bay Hills, is not within the planning area, but is classified as active and would significantly affect the East County in the event of seismic activity.

In addition, several smaller faults (also belonging to the San Andreas System) traverse the East County. These include the Las Positas Fault, which is considered active, and the Pleasanton, Mission and Verona faults, which are classified as potentially active. Also found in the area are the Livermore and Mocho Faults, which are classified as activity uncertain. Table E-3 summarizes the classification of the faults discussed above, and the maximum credible earthquake for each; Figure 32 maps these faults within a countywide context.

TABLE E-3		
Faults Affecting the East County		
Fault	Classification	Maximum Credible Earthquake (Richter Magnitude)
San Andreas*	Active	8.5
Hayward*	Active	7.5
Calaveras	Active	7.5
Greenville	Active	6.7
Las Positas	Potentially Active	N/A
Pleasanton	Potentially Active	5.5
Mission	Potentially Active	N/A
Verona	Potentially Active	6.8
Livermore	Potentially Active	6.5
Mocho	Activity Uncertain	N/A
*Fault Lies Outside of Planning Area		
Sources: Woodward - Lungren, 1973; Borchardt, et. al., 1975; ABAG, 1987		

**Recent/Potential Seismic Activity in the East County.** Major seismic activity occurred on the Greenville Fault in January 1980, resulting in two earthquakes--one of 5.9 magnitude which occurred eleven miles north of Livermore and one of 5.2 magnitude which occurred four miles north-northeast of Livermore. Smaller earthquakes have since occurred on other faults in the East County, but all have been relatively insignificant.

Seismic activity need not occur within the East County itself to have significant effects on lands within the planning area. Recent earthquakes on faults within Contra Costa, San Benito, and Santa Clara Counties have been widely felt in the planning area, and the 1989 Loma Prieta earthquake, with an epicenter located 70 miles to the south in Santa Cruz, was strongly felt in the East County, although little specific damage resulted.

According to the California Division of Mines and Geology, the Hayward, Calaveras, and Greenville Faults could each experience maximum credible earthquakes of magnitude 6.8 to 7.3. The other, smaller faults in the East County (such as the Las Positas) are also capable of producing earthquakes, albeit smaller ones, with a probable magnitude of 5 to 6. The United States Geological Survey has estimated that there is a 67 percent probability that one

or more earthquakes of 7.0 magnitude or larger will strike the Bay Area within the next 30 years.

## **Regulatory Setting**

Surface Mining and Reclamation Act. In 1975, the Surface Mining and Reclamation Act (SMARA) was adopted in response to the growing loss of significant mineral resources (due to factors such as urban expansion). SMARA mandates two processes--classification and designation--in order to identify land containing mineral resources that are of statewide or regional importance, and ensure their availability. The classification process requires the State Geologist to inventory and classify selected mineral resources, based upon geologic factors in specified geographic areas. The purpose of the report is to classify lands in a region with respect to the presence or absence of mineral resources; identify the market area of the commodity; and project the future need of the commodity in the study area. The classification process thus disregards land use in its evaluation. The designation process, by contrast, identifies those mineral deposits which are significant on a regional basis and are available for extraction (thus incorporating current land use into the picture).

SMARA requires that prior to any proposed development in areas that could threaten extraction of a resource, a city or county must prepare a statement specifying reasons for allowing the development. The statement should demonstrate that the reasons are in accordance with the affected jurisdiction's mineral resource management policies, and show that the value of the resource to the region and state have been adequately considered. The need for an environmentally-sound approach to mining has been given additional impetus by the 1990 amendments to SMARA. These amendments placed particular focus on reclamation issues, which have been, and will continue to be, of significance to the planning area.

## **■ TRENDS**

### **Conversion of Valuable Soils to Urban Uses**

It is not coincidental that the areas most valued for development, due to their level terrain, are often the areas containing the most valued soils; alluvial plains such as the Livermore-Amador Valley are broad, flat areas deposited with sediment-rich, fertile soils ideally suited for agriculture. In the East County, as elsewhere, urbanization of the valley floor has resulted in the conversion of thousands of acres of prime soils (see Figure 8 in the *Agriculture* background report in Section A). Similarly, portions of the East County with valuable sand and gravel resources are overlain with prime agricultural soils (both of which are the result of stream deposits). To take advantage of one resource means that the other cannot be exploited, although agricultural use can continue as an interim use while sand and gravel harvesting proceed over time on adjacent parcels.



## ■ PLANNING ISSUES

### Potential Land Use Conflicts

Alameda County has generally recognized the value of maintaining active quarries in those areas designated as significant mineral resource areas, to the extent that demand for mineral products remains sufficient and environmental concerns can be adequately addressed. The County has also recognized the importance of preserving agriculturally-valuable soils, including those which are not considered "prime" but are appropriate for viticultural activity.

Mineral extraction and agricultural uses can conflict not only with one another, but with proposed urban development. Indeed, while it is sometimes possible to accommodate quarry operations and agricultural activity on the same site, introduction of urban development permanently precludes access to the resources (agricultural soils or mineral deposits) on-site; depending on siting and the type of land use, urban development may also preclude access to adjacent parcels.

Policies dealing with such conflicts should allow for case-by-case evaluation based on factors such as present land use, possible future land uses, prospects for reclamation, local and regional needs, etc. The need to specify guidelines to minimize incompatibility between land uses, and resolve conflicts between existing land uses, is discussed in greater detail in the background reports found in the *Land Use* section of this plan.

## ■ POLICY IMPLICATIONS

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

### *Soils*

- o Conservation of soil resources in order to protect their long-term productivity and economic value*
- o Conservation of agricultural land (or other land with sensitive soil conditions)*
- o Encouragement of existing programs at the local, state and federal levels aimed at soil conservation and restoration*
- o Exclusion from the urban boundary of those areas known to contain soils placing severe constraints upon development.*

**Minerals**

- o Use and management of mineral resources in a manner compatible with environmental considerations; minimization of quarrying impacts on surrounding land uses and the natural environment*
- o Recognition of special natural resources on or adjacent to proposed quarry properties; protection of such resources prior to commencement of quarry activity*
- o Protection of valuable mineral resource areas from incompatible land uses through zoning and other land use controls*
- o Phasing of mineral extraction activities to minimize the disturbance of agriculturally valuable soils.*
- o Support for compatible land uses immediately adjacent to resource areas (e.g., secondary industrial areas, low-density recreation facilities, open space)*

## **SOURCES**

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Soil Conservation Service, U.S. Department of Agriculture, Soil Survey: Alameda Area, California, March 1966.

U.S. Department of Energy and University of California, Draft EIR and EIS for Continuing Operation of LLNL and SNL in Livermore, California, 1992.





## **Hydrology and Water Quality**

### **■ INTRODUCTION**

This report describes the existing surface water and groundwater resources within the planning area and the potential planning issues pertaining to the quality of those waters. See the *Flood Hazards* background report in Section F for issues related to flooding; see the *Water Supply* background report in Section D for issues related to water use and distribution; and see the *Wastewater* background report in Section D for additional discussion of water quality.

### **■ EXISTING CONDITIONS**

#### **Surface Water Hydrology**

The East County planning area is divided into three major surface water drainage units. The Livermore drainage unit and the Sunol drainage unit together drain the Alameda Creek watershed which is located along the western and central portions of the planning area (see Figure 33). The major streams of the Livermore drainage unit, which is the largest of the two Alameda Creek basins, are Arroyo Las Positas, Arroyo Mocho, Arroyo del Valle, Alamo Creek, and Tassajara Creek. Arroyo Las Positas, Arroyo Mocho and Arroyo del Valle drain the uplands which surround the Livermore Valley (including San Antonio Valley in Santa Clara County to the south where the headwaters of the Arroyo del Valle originate). Alamo Creek and Tassajara Creek drain the uplands of Amador Valley. A portion of their drainage basins lie outside the planning area in Contra Costa County to the north. The streams of the Livermore drainage unit join at a confluence in the Livermore Valley near Pleasanton and form the Arroyo de la Laguna which flows to the south into the Sunol Basin.

The Sunol drainage unit, located to the west of the Livermore drainage unit, is drained by Alameda Creek and its tributaries. These tributaries include the San Antonio Creek basin and the San Antonio Reservoir; and the Calaveras Creek Basin whose headwaters lie within Santa Clara County to the south.

The Livermore and Sunol surface drainage units drain to a confluence located south of Pleasanton. At this location Alameda Creek from the Sunol unit and Arroyo De La Laguna from the Livermore unit converge and flow out of the planning area through Niles Canyon. Alameda Creek is the only drainage outlet for the Livermore and Sunol surface drainage units and therefore is important in controlling the flooding and drainage of the upstream basins.

Precipitation in the planning area is highly seasonal with almost 90 percent of the annual precipitation occurring during the six-month period of November through April. Most of the precipitation occurs as rainfall in a series of general storms which affect all portions of the East

County; however, variations in local physiography strongly influence the intensity and amount of precipitation. Rainfall maps showing lines of mean annual precipitation demonstrate this increase in rainfall with elevation especially around the peaks and ridges in the Livermore Drainage Unit (see Figure 34).

Imported water discharged into the streams in the Livermore drainage unit from outside the planning area, diversions of flow to other drainage units, and the construction of water storage reservoirs have altered the natural runoff characteristics of the major watercourses in the East County. The major effects of the modifications in the natural runoff regime have been a reduction in peak storm flows and total annual discharge and a sustainment of greater than natural stream flow during the dry season. These augmentations have also increased the opportunity for groundwater recharge to the aquifers by increased infiltration through the gravel stream channels within the central portion of Livermore-Amador Valley.

The relative absence of any significant natural surface storage areas in the planning area, and the seasonal nature of prevailing precipitation patterns have necessitated the construction of large multi-purpose reservoirs located on major watercourses. Calaveras, San Antonio and Del Valle Reservoirs are the major reservoirs located at least partially within the planning area (Figure 33). Calaveras and San Antonio Reservoirs supply municipal water as part of the Hetch Hetchy Aqueduct System. These reservoirs have total capacities of 100,000 and 50,500 acre-feet respectively (U.S. Army Corps of Engineers, 1985). Lake Del Valle located to the south of Livermore regulates South Bay Aqueduct flows, provides flood control storage, and is used for recreation purposes.

No natural lakes are found within the planning area. A few small stock ponds and natural ponds, silt basins, and stormwater retention ponds are found throughout the East County. The majority of the stock ponds are located in the foothill regions to serve the extensive grassland areas utilized for grazing. These ponds and basins which have been constructed by private landowners to provide water supply for livestock. Silt and stormwater retention basins are also becoming more prevalent in urban areas.

### **Groundwater Hydrology**

The Sunol and Livermore drainage units have been divided into a total of 14 groundwater subbasins by the Alameda County Flood Control and Water Conservation District, Zone 7, based on hydrogeologic and geologic factors. These groundwater subbasins contain water-bearing geologic formations which could be affected by land use practices within the basins. Figure 35 presents the boundaries of the groundwater subbasins and Figure 36 presents groundwater level contours.

The primary water-bearing geologic formations within the East County are found in the valley floor deposits of the Livermore, Sunol, La Costa, and Vallecitos Valleys and in the adjacent uplands to the south, west and north of the Livermore Valley. The three significant water-bearing formations within these areas are the Tassajara Formation, the Livermore Formation, and the alluvial valley fill (California Department of Water Resources, 1966).



The Tassajara Formation is located north of the Livermore Valley within the Tassajara and Altamont uplands and beneath the central portions of the Livermore Valley. The Tassajara Formation is found at depths ranging from 200 to 750 feet below the ground surface. The sandstone aquifer within the Tassajara formation has a relatively low permeability and yields low quantities of moderately good quality waters suitable for limited stock, domestic, and irrigation use.

The geologically younger Livermore Formation occurs beneath the valley floor alluvial deposits of both the Livermore and Sunol drainage units. The Livermore Formation is found at depths ranging from 30 to 400 feet below the ground surface. The Livermore Formation is also exposed in the upland areas on the south and east side of the Livermore Valley and on the east side of Sunol Valley. The clayey gravel aquifers in the Livermore Formation yield significant quantities of good quality water in the eastern section of the Livermore Valley for municipal, industrial, and agricultural users.

The valley floor alluvial deposits which overlay the Tassajara and Livermore Formations are composed of Holocene Age unconsolidated gravel, sand, silt, and clay that range in from a few feet to almost 400 feet in thickness. The alluvium is generally an unconfined aquifer in most locations throughout the Livermore-Amador Valley. Wells in this formation produce groundwater of a generally good quality suitable for high capacity uses.

The horizontal movement of groundwater within the 15 sub-basins is controlled by faults, variations in aquifer thickness, and the different permeability of aquifer materials. Groundwater movement in the Livermore Valley generally occurs downslope toward the longitudinal axis of the valley and then in a westerly direction to the Bernal sub-basin. Recharge of the groundwater basin is accomplished by infiltration and percolation of precipitation, streamflow, and applied water. Subsurface inflow provides a limited source of replenishment where wells penetrate both the alluvium and the underlying Tassajara and Livermore Formations and where stream channels intercept the Livermore Formation.

### **Water Quality**

Surface Water Quality. The quality of surface runoff from the Alameda Creek Basin is generally good although surface water quality may be reduced by soil erosion, frequently caused by development or improper land use activities. Erosion generates excessive sediment loads in surface runoff which can increase the turbidity levels within the reservoirs utilized for water storage and recreational activities.

Groundwater Quality. In general, groundwater quality within the central basin is good, while fringe basins tend to have poorer ambient water quality. Groundwater quality is usually dependent upon the quality of surface runoff which percolates into the basin and the chemical and physical properties of subsurface sediments. The central and southern portions of the Livermore Valley are recharged from streamflow of the Arroyo Mocho and Arroyo Del Valle which exhibit good quality magnesium bicarbonate and calcium bicarbonate waters. The eastern area of the Livermore Valley, however, contains some groundwater of poor quality sodium chloride character. Another area of poor quality sodium chloride and sodium sulfate water

occurs southeast of Dublin. Excessive concentrations of nitrate, boron, and total dissolved solids are found in various sites throughout the Livermore Valley and frequently are high enough to render groundwater undesirable for domestic, industrial or agricultural use. Groundwater quality in the Sunol Valley is usually adequate for irrigation purposes although some excessive nitrate concentrations are evident in some shallow wells (California Department of Water Resources, 1966).

Through nitrification and leaching, nitrogen from various sources can increase levels of nitrates in the groundwater. Well testing in the Livermore Valley found groundwater with nitrate concentrations greater than the drinking water standard of 10mg/L in an area underlying much of Livermore and the South Livermore Valley. The highest concentrations of nitrates were in the Buena Vista Avenue area, with levels double the drinking water standard (USGS, 1985). High nitrate levels can cause an illness in infants (methemoglobinemia or nitrate cyanosis), sometimes called "blue babies", and may be partially responsible for the occurrence of goiter.

A preliminary study on nitrate sources in the Livermore Valley (Zone 7, 1980) found that agricultural activities and residential wastewater are probably the most significant contributors of net nitrogen to the Valley's groundwater. While no comprehensive studies have been completed, a rough calculation of nitrogen balance by Zone 7 estimated that agricultural activities may conceivably contribute 85 percent of the total net nitrogen load, with livestock being the single largest source (57 percent). Agricultural fertilizers and wastewater effluent from domestic sources each could contribute some 27 percent of total Valley nitrogen loading.

Infiltration and runoff of unconsumed agricultural irrigation waters are problems which occur wherever agricultural land use is prevalent. High nutrient and salt loads from fertilizers and concentrations of pesticides are common constituents of such waters. This source of degradation is particularly significant in the Livermore Valley where a closed groundwater basin and an adverse salt balance already exist (California Department of Water Resources, 1966). Seepage into the underlying aquifers from urban runoff and authorized or unauthorized land disposal of solid waste can also contribute to groundwater degradation.

### **Regulatory Setting**

Water quality regulatory programs in the 1970s and the 1980s focused on "point sources" of water pollution, such as wastewater treatment plants and industrial dischargers. Addressing point sources of pollution has resulted in improvements to water quality, however, water quality is still being degraded by non-point sources of pollution (that is, sources of pollution not coming from a specific source). Non-point source pollutants are washed off land and roads by stormwater runoff into storm drainage systems and water bodies and probably exceed point source contributions. The types of pollutants typically found in runoff include: grease, oil, toxic chemicals and substances, lead and other metals, sediments, bacteria, organic substances and nutrients. Non-point source pollutants come from a variety of sources including fertilizers and pesticides used by agricultural activities, home and yard uses; oil and other automotive fluids leaking onto roads, parking lots and driveways; erosion and sedimentation from construction sites; and any substances spilled or littered in streets and parking lots.



State and federal regulations are the driving force behind implementation of programs addressing water quality. The 1972 Clean Water Act, the Water Quality Act of 1987, and federal Storm Water Regulations are three federal regulatory schemes requiring state and local action. The Water Quality Control Plan for the San Francisco Bay Basin, Region 2, describes policies and programs to maintain and improve water quality of San Francisco Bay and its tributaries that are to be implemented by the San Francisco Regional Water Quality Control Board and local agencies. These regulations and programs are discussed in more detail below.

Federal Clean Water Act. The 1972 Clean Water Act (CWA) prohibits the discharge of any pollutant to navigable waters from a point source unless the discharge is authorized with a National Pollution Discharge Elimination System (NPDES) permit. Efforts to improve water quality under this NPDES program traditionally focused on reducing pollutants in industrial process wastewater and municipal sewage. In the last few years, it has become evident that more diffuse sources (occurring over a wide area) of water pollution, such as agricultural discharges and urban runoff are also major causes of water quality problems. These non-point sources typically enter municipal storm drain conveyance systems and watercourses, which from a legal standpoint are considered point sources according to the CWA.

Water Quality Act of 1987. The Water Quality Act of 1987 contains provisions that allow NPDES permits to be issued on a system- or jurisdiction-wide basis, requires NPDES permits to effectively prohibit non-stormwater discharges into storm drain sewers, and requires controls to be implemented to reduce the discharge of pollutants to the maximum extent possible.

Federal Storm Water Regulations. The United States Environmental Protection Agency (EPA) has established regulations to implement sections of the Clean Water Act pertaining to NPDES permit requirements for stormwater discharges from municipal storm drain systems. The regulations also establish the required components of municipal storm water management plans.

San Francisco Regional Water Quality Control Board. The San Francisco Regional Water Quality Control Board (Regional Board) is one of nine regional water quality control boards in the state under the direction of the State Water Resources Control Board. The Regional Board is responsible for maintaining and improving water quality in San Francisco Bay and its tributaries. The Regional Board is required by law to develop policies and programs to carry out its responsibilities and these are contained in the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan).

The Basin Plan requires implementation of a program to evaluate pollutants in urban runoff, estimate pollutant loads, and identify control measures which would help reduce the amount of pollutants in urban runoff.

Alameda County Urban Runoff Clean Water Program. The Alameda County Urban Runoff Clean Water Program has been established in order to comply with the Regional Board's Basin Plan revisions adopted in 1986 and requirements of the federal Clean Water Act and other federal regulatory programs discussed above. There are seventeen agencies in Alameda County participating in the implementation of the Program. These agencies are: Alameda County, Alameda County Flood Control and Water Conservation District, the District's Zone 7 (which



serves the East County), and all fourteen Alameda County cities. The Alameda County Flood Control District is responsible for administering the overall program.

The Program participants worked jointly to prepare the *Storm Water Management Plan for the Alameda County Urban Runoff Clean Water Program* (June 28, 1991) which is an integral and enforceable part of the Program's NPDES permit. (A Storm Water Ordinance has been adopted to implement the plan.) The Storm Water Management Plan contains strategies for controlling pollutant discharges from urban runoff flowing into municipal storm drain systems. The Storm Water Management Plan proposes a number of management practices and control techniques, to be implemented over the 5-year permit period, for seven program components. The seven program components are:

- Public Information and Participation
- Municipal Government Activities
- New Development and Construction Site Controls
- Illicit Discharge Identification and Elimination
- Industrial Dischargers Identification and Runoff Control
- Monitoring
- Storm Water Treatment

The "New Development and Construction Site Controls" component identifies non-point source pollution control measures that will be required as a condition of approval for development projects for pre-construction, construction, and post-construction activities that are designed to reduce the amounts of pollutants and sediments discharged into the storm drainage system.

Activities that will be conducted under the other program components include developing guidelines for planning and inspection, educating planning and public works staff to improve plan checking and permit review processes, increasing the number of inspections conducted both during and after construction, and educating and providing guidance to developers, contractors and engineers/architects.

The non-point source pollution control measures to be required as a condition of development approval include the use of best management practices during construction (e.g., proper material and equipment storage and handling, and temporary erosion controls) and installation of permanent controls (e.g., use of detention basins, infiltration trenches, and permanent erosion controls) that will be maintained over the life of the project.

Alameda County Watercourse Protection Ordinance. The County's Watercourse Protection Ordinance (adopted 1982) was enacted to restrict discharge of polluted materials to watercourses and encroachment of new development into the watercourse area in unincorporated areas of the County. In addition to prohibiting discharge into watercourses, the Ordinance establishes a 20-foot setback from the top of the bank necessary to contain flow from the 100-year flood event in order to keep the waterway area clear of new development. Implementation of the ordinance serves to protect surface water and groundwater recharge areas from erosion, sedimentation and sources of pollution.

## ■ PLANNING ISSUES

### Storm Water Management Plan

The County's recent Storm Water Management Plan addresses most surface water quality issues by requiring strict measures to control erosion and sedimentation and non-point source pollution from urban run-off. New development and major redevelopment projects may be required to construct permanent retention/detention basins and infiltration trenches. These permanent water control features present an opportunity to serve multiple uses such as fish and wildlife habitat, open space, recreational uses (passive and active) and flood control. They also present potential problems in terms of safety and nuisance issues (i.e. as mosquito breeding grounds). Therefore, design review of these water control features is critical for successful implementation of the Storm Water Management Plan. It is important that design review be undertaken in conjunction with other responsible and/or interested agencies so as to reduce conflict between conflicting goals (see the *Flood Hazards* background report in Section F).

An additional concern is the effect on groundwater quality in those areas where urban runoff water from onsite detention/retention basins can percolate into the groundwater basin. This issue is being researched by the Public Works Agency.

### Septic Tank Systems

The use of septic tank systems is inappropriate under conditions where the groundwater basin may become contaminated by effluent (see the *Wastewater* background report in Section D).

### Agricultural Practices

Treated effluent has been used to irrigate agricultural lands in the planning area. The high salt content of the effluent can have a significant impact on the groundwater resources by contributing excessive mineral concentrations. Irrigation with wastewater that has been received tertiary treatment, such as the reverse osmosis demineralization process which removes dissolved salts, should be encouraged. This issue is also discussed in the *Wastewater* background report in Section D.

The EIR for the South Livermore Valley Area Plan (June 1992) contains mitigation measures that address degradation of groundwater quality from use of nitrogen fertilizers in the South Livermore Valley.

### Land Use Activities in Watersheds and Groundwater Recharge Areas

Land uses which cause erosion and sedimentation and/or pollute surface water should be restricted in sensitive watersheds used to collect and store water for urban uses. Watershed lands are discussed in the *Non-Urban Land Use and Open Space* background report in Section A and in the *Biological Resources* background report in Section E. Land uses that have the

potential to pollute groundwater resources should also be restricted or required to implement pollution control measures.

## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Implementation of the County's Urban Runoff Clean Water Program and Storm Water Management Plan*
- *Development of design criteria for the multi-use of on-site water control features required under the County's Storm Water Management Plan*
- *Protection of the groundwater basin by controlling use of septic tank systems and agricultural practices*
- *Protection of the groundwater basin by controlling potentially polluting land uses in areas over a significant groundwater basin*
- *Control of erosion and the sedimentation of watercourses caused during and after construction and by other land disturbing activities*
- *Use of recycled water, treated by the reverse osmosis or other demineralization process, for agricultural irrigation*
- *Reduction in use of herbicides by public agencies*



## **SOURCES**

Alameda County Flood Control and Water Conservation District, Zone 7, Preliminary Assessment of Nitrate/Nitrogen Loading Agents and Removal Mechanisms Impacting Local Groundwaters within the Livermore/Amador Valley, 1980.

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California Department of Water Resources (DWR), Livermore and Sunol Valleys--Evaluation of Groundwater Resources, Appendix A: Geology, 1966.

United States Army Corps of Engineers (USACOE), San Francisco District, Upper Alameda Creek Urban Study Background Information Appendix, 1985.

United States Geological Survey, Water Quality Conditions and an Evaluation of Ground- and Surface-Water Sampling Programs in the Livermore-Amador Valley, California, Report 84-4352, 1985.



## **Air Quality**

### **■ INTRODUCTION**

The quality of the air in a region is determined by several factors. Every air basin or sub-air basin has a number of natural characteristics which limit the ability of natural processes to either dilute or transport air pollutants. The amount of pollutants emitted will also determine air quality. Transport of pollutants from upwind areas is also a major determinant of an air basin's resulting air quality. This report addresses existing air quality conditions, standards, and issues in the East County.

### **■ EXISTING CONDITIONS**

#### **Air Basin Characteristics**

The Livermore-Amador Valley forms a small subregional air basin distinct from the larger Bay Area Air Basin. The air basin is surrounded on all sides by high hills or mountains. Significant breaks in the hills surrounding the air basin are Niles Canyon and the San Ramon Valley, which extends northward from the study area into Contra Costa County.

The terrain of the Livermore-Amador Valley influences both the climate and air pollution potential of the subregional air basin. As an inland, protected valley, the area has generally lighter winds and a higher frequency of calm conditions when compared to the greater Bay Area.

The occurrence of episodes of high atmospheric stability, known as inversion conditions, severely limits the ability of the atmosphere to disperse pollutants vertically. Inversions can be found during all seasons in the Bay Area, but are particularly prevalent in the summer months when they are present about 90% of the time in both morning and afternoon.

The Livermore-Amador subregional air basin is generally downwind of the greater Bay Area, and therefore is subject to pollutants transported to the area by prevailing winds.

The combined effects of relative light winds, surrounding higher terrain and frequent temperature inversions that restrict vertical give the Livermore-Amador subregional air basin a high potential for pollution. During the summer months the light winds, warm temperatures and downwind location (relative to the greater Bay Area) typical of the Livermore-Amador Valley are conducive to the creation of ozone. During the winter months, high atmospheric stability, calm winds and cold temperatures combine to create ideal conditions for the buildup of pollutants such as carbon monoxide and PM-10.



## **Air Quality Standards**

The Mulford-Carrell Act of 1969 and the Clean Air Act of 1970 established state and federal air quality standards for several pollutants. These standards are divided into primary standards, designed to protect the public health, and secondary standards, intended to protect the public welfare from effects such as visibility reduction, soiling, nuisance and other forms of damage.

The pollutants covered under the above-described legislation are known as "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. Another group of substances known as Toxic Air Contaminants (TACs), are injurious in small quantities and are regulated despite the absence of criteria documents. The identification, regulation and monitoring of TACs is relatively recent compared to that for criteria pollutants. State and federal ambient air quality standards are shown in Table E-4.

## **Pollutant Characteristics**

Of the pollutants shown in Table E-4, ozone and PM-10 levels present the most serious problems in the Livermore-Amador subregional air basin. Carbon monoxide is also a potential problem on a more localized basis. The following is a description of the characteristics and sources of these problem pollutants.

Ozone. Ozone is the most prevalent of a class of photochemical oxidants formed in the urban atmosphere. The creation of ozone is a result of a complex chemical reactions between hydrocarbons and oxides of nitrogen in the presence of sunshine. Unlike other pollutants, ozone is not released directly into the atmosphere in substantial quantities from any sources. The evaporation of solvents and fuels and combustion from factories and automobiles are the major sources of oxides of nitrogen and hydrocarbons, known as ozone precursors.

The health effects of ozone are eye irritation and damage to lung tissues. Ozone also damages some materials such as rubber, and may damage plants and crops.

PM-10. PM-10 (Particulate Matter, 10 micron) consists of solid and liquid particles of dust, soot, aerosols and other matter which are small enough to remain suspended in the air for a long period of time. A portion of the suspended particulate matter in the air is due to natural sources such as windblown dust (which may be exacerbated by agricultural tilling) and pollen. Man-made sources include combustion, automobiles, field burning, factories and unpaved roads.

The effects of high concentrations on humans include aggravation of chronic disease and heart/lung disease symptoms. Non-health effects include reduced visibility and soiling of surfaces.

Carbon Monoxide. Carbon monoxide is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels, and its main source in the Bay Area is automobiles. Because its major source is automobiles, high concentrations of carbon monoxide are typically found very close to major roadways and intersections.

Emissions of carbon monoxide from automobiles is highly dependent on the operating conditions. Congested traffic, with extended idling times and slow speeds creates far more carbon monoxide than free-flowing traffic. The term "hot spot" is often used to describe an area of high concentration surrounding near a surface intersection or freeway interchange.

Carbon monoxide's health effects are related to its affinity for hemoglobin in the blood. At high concentrations, carbon monoxide reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity and impaired mental abilities.

TABLE E-4

## Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standard	State Standard
Ozone	1-Hour	0.12 PPM	0.09 PPM
Carbon Monoxide	8-Hour	9.0 PPM	9.0 PPM
	1-Hour	35.0 PPM	20.0 PPM
Nitrogen Dioxide	Annual	0.05 PPM	--
	1-Hour	--	0.25 PPM
Sulfur Dioxide	Annual	0.03 PPM	--
	24-Hour	0.14 PPM	0.05 PPM
	1-Hour	--	0.50 PPM
PM-10	Annual	50 ug/m3	30 ug/m3
	24-Hour	150 ug/m3	50 ug/m3
Lead	30-Day Average	--	1.5 ug/m3
	3-Month Average	1.5 ug/m3	--

Notes: PPM = Parts Per Million  
ug/m3 = Micrograms per Cubic Meter

The federal standards are defined as "the levels of air quality necessary, with an adequate margin of safety to protect the public health". The California standards are defined as specified concentrations and durations of air pollutants which reflect the relationship between the intensity and composition of air pollution to undesirable effects (as established by the California Air Resources Board).

## **Air Pollutant Sources**

The East County contains a multitude of air pollution sources. The combustion of fuel for space and water heating, industrial processes and commercial uses is one such pollutant source. The evaporation of fuels and solvents, incineration, fires, and pesticide use are other examples of typical pollutant sources. The largest single source of pollutants is on-road vehicles, which in Alameda County as a whole are responsible for 83% of the emitted carbon monoxide, 69% of the emitted oxides of nitrogen, 47% of the emitted sulfur dioxide, 46% of the emitted hydrocarbons, and 7% of the emitted particulates (California Air Resources Board, 1991).

The East County does not contain large industrial "smokestack" stationary sources. Large industrial sources are limited to sand and gravel operations and related concrete and asphalt products manufacturers. Numerous small industrial sources of criteria and TAC emissions are located in the cities of Dublin, Pleasanton and Livermore. The Livermore-Amador Valley also receives air pollutants emitted in the greater Bay Area and transported to the valley by prevailing winds.

## **Attainment Status and Regional Air Quality Plans**

The federal Clean Air Act and the California Clean Air Act of 1988 require that the State Air Resources Board, based on air quality monitoring data, designate portions of the state where the federal or state ambient air quality standards are not met as "nonattainment areas". Because of the differences between the national and state standards, the designation of nonattainment areas is different under the federal and state legislation.

Federal Air Quality Program. For the purposes of the federal Clean Air Act all of Alameda County has been designated as nonattainment for ozone. The urbanized area of the county (which includes the Livermore-Amador Valley) is considered nonattainment for carbon monoxide, while the remainder of the county (which includes the rest of the planning area) is considered attainment for carbon monoxide. The county is an attainment area or is unclassified for all other national ambient air quality standards (California Air Resources Board, November 1989).

The states were required to prepare a State Implementation Plan (SIP) to show how the federal standards were to be attained by 1987. The Bay Area portion of the SIP was the *1982 Bay Area Air Quality Plan* (ABAG et al., December 1982). Despite considerable improvement in air quality, the Bay Area did not meet the 1987 deadline for attainment of the federal air quality standards.

The federal Clean Air Act Amendments of 1990 require that non-attainment areas develop plans and strategies that will reduce pollutants by 15% during the first 6 years, then 3% annually thereafter until the standards are met. A revised federal air plan is required by 1994.



State Air Quality Program. Under the California Clean Air Act, Alameda County is a nonattainment for ozone and PM-10. The county is either attainment or unclassified for other pollutants (California Air Resources Board, November 1989).

The California Clean Air Act requires local air pollution control districts to prepare air quality attainment plans. These plans must provide for district-wide emission reductions of 5 % per year averaged over consecutive three-year periods or if not, provide for adoption of "all feasible measures on an expeditious schedule". The Act also grants air districts explicit statutory authority to adopt indirect source regulations and transportation control measures, including measures to encourage or require the use of ridesharing, flexible work hours or other measures which reduce the number or length of vehicle trips.

The area-wide plan required by the California Clean Air Act was adopted in October 1991 (Bay Area Air Quality Management District, 1991). The Plan proposes the imposition of controls on stationary sources (factories, power plants, industrial sources, etc.) and Transportation Control Measures designed to reduce emissions from automobiles. Since the Plan does not provide for a 5% annual reduction in emissions, it proposes the adoption of "all feasible measures on an expeditious schedule".

## ■ TRENDS

### **Air Quality Continues to Improve in the Livermore-Amador Valley**

The only air monitoring site within the East County is located in Livermore. Table 2 shows a summary of air quality data for this monitoring site for the period 1982-1991. Data is shown for ozone, carbon monoxide and PM-10. The annual maximum concentration and number of days exceeding the state or federal standard are shown for each year.

Table E-5 shows slow improvement in ozone air quality during the 10-year period 1982-1991. The overall trend over the period is downward for the number of days exceeding the standard and maximum concentration. Because of variable meteorology from year to year, ozone concentrations are often averaged over a three-year period to eliminate some of the fluctuations caused by climatic differences between years. Trends are easier to detect in the 3-year averaged data: in 1984 the 3-year averaged days above the federal standard was 5.3; in 1987 it was 3.33 and in 1991 it was 1.33. The corresponding number of days over the state standard was 20.3 in 1984, 17.0 in 1987 and 11.3 in 1991.

Similar, but less dramatic down-trends are seen for carbon monoxide and nitrogen dioxide. PM-10 has been measured in Livermore only since 1987. During this time a steady upward trend is seen both for the maximum concentration measured and number of days above the state and federal standards. The reason for this trend is not clear; it may be related to land use changes near the monitoring site, increased fireplace use in Livermore, or could possibly be related to the continued drought in the region.

TABLE E-5

## Summary of Air Quality Data For Livermore - 1982-1991

		Year									
Pollutant	Standard	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
<b>Ozone</b>											
Highest 1-Hour (PPM)		0.14	0.16	0.15	0.15	0.14	0.15	0.15	0.14	0.13	0.14
Days > 0.09	State	9	20	32	21	20	21	21	9	8	17
Days > 0.12	Federal	1	8	7	4	3	4	4	2	1	1
<b>Carbon Monoxide</b>											
Highest 1-Hour (PPM)		8	10	12	8	10	8	8	10	8	8
Days > 20.0	State	0	0	0	0	0	0	0	0	0	0
Days > 35.0	Federal	0	0	0	0	0	0	0	0	0	0
Highest 8-Hour (PPM)		5	4	4	5	6	4	4	4	5	4
Days > 9.0	State/Federal	0	0	0	0	0	0	0	0	0	0
<b>Nitrogen Dioxide</b>											
Highest 1-Hour (PPM)		0.10	0.15	0.09	0.10	0.10	0.08	0.11	0.10	0.09	0.11
Days > 0.25	State	0	0	0	0	0	0	0	0	0	0
<b>PM-10*</b>											
Highest 24-Hour (ug/m3)		-	-	-	-	-	87	74	108	137	151
Days > 50 ug/m3	State	-	-	-	-	-	5	7	13	10	12
Days > 150 ug/m3	Federal	-	-	-	-	-	0	0	0	0	1

\*Unlike other pollutants, PM-10 is measured for a 24 hour period every sixth day.

Source: California Air Resources Board, 1983-1992.

The *Bay Area '91 Clean Air Plan* forecasts continued improvement in regional air quality. An analysis of carbon monoxide trends shows attainment of the standards throughout the Bay Area by the mid-1990s. However, implementation of the Clean Air Plan would not provide for attainment of the state ozone standard even by the year 2000. The current Clean Air Plan addresses ozone and carbon monoxide only; PM-10 will be addressed in a future update of the Clean Air Plan.

### **New Local, State and Federal Air Quality Controls Will Continue to Be Implemented**

The failure of most metropolitan areas in the United States and in California to attain the federal and state standards have resulted in new federal and state legislation requiring the development and implementation of regional plans to attain the standards. Within the next several years many new statewide and local rules, regulations and programs will be adopted with the purpose of controlling air pollution sources. The major thrust in air pollution planning in the near future is likely to be:

- more stringent controls on sources previously controlled such as automobiles, paints and solvents, industrial sources, power plants, etc.;
- new controls on sources previously uncontrolled or considered insignificant such as consumer products, lawnmowers and small gasoline engines, off-road equipment and vehicles, etc;
- increasing interest in the relationships between neighboring air basins, such as the Livermore-Amador Valley subregional air basin and the adjacent San Joaquin Valley Air Basin;
- new efforts to reduce vehicle-related emissions by modifying driver behavior and choice; and
- increased coordination of transportation and land use planning with air quality goals and requirements.

### **Continued Growth in San Joaquin County Will Result in Increased Pollution From Commute Vehicles**

Housing prices and local resistance to new development in established metropolitan areas within the East Bay area have accelerated the rate of growth in areas on the fringe of the Bay Area. The past 10 years has seen tremendous pressure to develop new housing in the western San Joaquin Valley for people employed in the Bay Area. While 20 years ago the Livermore-Amador Valley would have been considered a suburban area providing inexpensive housing for people working elsewhere in the Bay Area, the Livermore-Amador Valley is gradually evolving into an employment center, with western San Joaquin County now providing inexpensive housing. The result of this change has been a tremendous upsurge in travel on the I-580 corridor and increasing congestion.



## ■ PLANNING ISSUES

### **Accommodation of Growth in a Nonattainment Area**

The Livermore-Amador Valley has been a nonattainment area for ozone for many years. The amount and rate of growth in population and traffic will affect whether and how much ozone air quality improves in the future. In the past ozone air quality has gradually improved due to controls on autos and stationary sources despite population and traffic growth. Defining appropriate growth rates and limits that are compatible with air quality goals will be a major issue that will not be easily resolved.

From an air quality standpoint, the trend towards long-distance commuting from the San Joaquin Valley to the Livermore-Amador Valley is a trend in the wrong direction. Dispersed, low-density development away from employment centers maximizes the use of the single-occupant automobile as the primary means of transportation at a time when the goal is reduced auto travel.

The issue of growth in the Livermore-Amador Valley is complicated by the regional connections between the subregional air basin, the greater Bay Area and the adjacent San Joaquin Valley Air Basin. Strategies to control growth in the Livermore-Amador Valley to accomplish air quality goals in that subregional air basin could conceivably exacerbate air quality problems for the larger Bay Area and San Joaquin Valley air basins if the result is increased pressure to develop housing in San Joaquin County for Bay Area commuters.

### **Relationship Between the East County Plan and Regional Air Plan**

Consistency between the East County Area Plan and the recently-adopted *Bay Area '91 Clean Air Plan* is an issue needing clarification. One obvious means of demonstrating consistency is the comparison of population and employment projections assumed in both the East County Area Plan and the *Bay Area '91 Clean Air Plan*. Since the *Bay Area '91 Clean Air Plan* is based on specific forecasts of population and employment within all the cities and counties within the nine-county Bay Area Air Quality Management District, plans and projects which would cause the Clean Air Plan population and employment forecasts to be exceeded have the potential to interfere with attainment of the air quality standards.

The *Bay Area '91 Clean Air Plan* proposes a program of implementation of "all feasible control measures" for the Bay Area. Another measure of consistency is thus whether the East County Area Plan utilizes "all feasible measures" appropriate for a planning-level document toward accomplishing air quality goals.

### **Interrelationship of Transportation and Air Quality Planning**

Air quality issues are becoming more inter-related with transportation and land use issues. These issues arise, to a certain extent, both in the California and federal Clean Air Act

requirements. Recent state transportation legislation (Katz, AB 471 and AB 1791) and federal transportation legislation (Intermodal Surface Transportation Efficiency Act) have air quality components that require consideration of the relationships between land use, transportation and air quality. Transportation planning programs (CMP and ISTEA) both contain air quality provisions, and may result in constraints for capacity-increasing roadway and freeway improvements in future years.

## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Establishing a level of development and jobs/housing balance that will allow the planning area to have continuously improving air quality*
- *Avoidance of new air quality problems and reduction of exposure to unhealthy air quality*
- *Contributing toward regional efforts to attain air quality standards in the Bay Area and San Joaquin Valley Air Basins*
- *Ensuring that plans and new proposed development use "all feasible measures" to reduce air quality impacts*

## SOURCES

Association of Bay Area Governments, Bay Area Air Quality Management District and Metropolitan Transportation Commission, 1982 Bay Area Air Quality Plan, December 1982.

Bay Area Air Quality Management District, Bay Area '91 Clean Air Plan (CAP), 1991.

Bay Area Air Quality Management District, Base Year 1983 Emissions Inventory Summary Report, August 1987.

California Air Resources Board, Area Designations for State and National Ambient Air Quality Standards, November 1989.



## Noise

### ■ INTRODUCTION

This report describes existing noise sources and noise-sensitive land uses in the East County. A brief introduction to noise terminology is included below to provide clarification regarding the terms and concepts used in this report.

Noise, defined as unwanted sound, is customarily measured in decibels (dB), units related to the apparent loudness of sound. A-weighted decibels (dBA) represent sound frequencies normally heard by the human ear. The normal range of human hearing extends from about 3 to 140 dBA; speech normally occurs between 60 and 65 dBA. Table E-6 contains a listing of typical sound levels found in the environment.

A logarithmic decibel scale is used to measure sound because hearing sensation increases with the logarithm of the stimulus intensity. Each 10 dBA increase in the level of a continuous noise is a ten-fold increase in sound energy, but is judged by a listener as only a doubling of loudness. For example, 60 dBA is judged to be about twice as loud as 50 dBA and four times as loud as 40 dBA. Each 3 dBA increase in sound is a doubling of sound energy, but is only judged as about a 20 percent increase in loudness, and is barely noticeable to most people. An increase in average noise of about 5 dBA is noticeable to most people, and is the level required before any noticeable change in community response would be expected (International Organization for Standardization, 1971).

Because environmental noise levels fluctuate over time, a time-averaged noise level in dBA is often used to characterize the acoustic environment at a given location. The average noise intensity over a given time is the energy equivalent noise level (Leq). To account for human sensitivity to nighttime noise levels, two relevant descriptors--day-night equivalent sound level (Ldn) and Community Noise Equivalent Level (CNEL)--were developed. Under noise and land use guidelines set by the California Department of Health Services, the 24-hour Ldn is divided into a daytime period of 7 A.M. to 10 P.M. and a nighttime period of 10 P.M. to 7 A.M. The nighttime noise level is weighted 10 dB higher than the daytime noise level. The Ldn is thus the A-weighted average sound level in decibels during a 24-hour period with 10 dBA added to the hourly Leqs during the nighttime. The CNEL is also the average noise level, in dBA, for a 24-hour period, with a weighting of 5 dBA for noise occurring between 7 P.M. and 10 P.M., and a 10 dBA weighting assigned to a noise occurrence between 10 P.M. and 7 A.M.

### ■ EXISTING CONDITIONS

#### State and Federal Noise Standards/Guidelines

Federal Highway Administration (FHWA) and California Department of Transportation (Caltrans). FHWA and Caltrans have similar policies for new roadway construction and

TABLE E-6

## Typical Sound Levels Measured in the Environment

	140	
Civil Defense Siren (100')	130	
Jet Takeoff (200')	120	Threshold of Pain
Riveting Machine	110	
Diesel Bus (15')	100	Rock Music Band Piledriver (50') Ambulance Siren (100')
Bay Area Rapid Transit Train Passby (10')	90	Boiler Room
Pneumatic Drill (50')	80	Printing Press Plant Garbage Disposal in the Home
S.F. Muni Light-Rail Vehicle (35') Freight Cars (100')	70	Inside Sports Car, 50 m.p.h.
Vacuum Cleaner (10')	60	Data Processing Center
Speech (1') Auto Traffic Near Freeway	50	Department Store Private Business Office
Large Transformer (200') Average Residence	40	Light Traffic (100')
	30	Typical Minimum Night Time Levels - Residential Areas
Soft Whisper	20	
Rustling Leaves	10	Recording Studio
Threshold of Hearing	0	Mosquito (3')

**Note:** 100' = Distance in Feet Between Source and Listener.

Shaded Areas indicate A-Weighted Sound Pressure Level, in Decibels.

**Source:** Noise Element of the Alameda County General Plan, 1975.

expansion. These policies contain maximum acceptable noise levels in areas adjacent to vehicular traffic; they also contain guidelines for determining when noise barriers should be constructed.

State of California. Title 21 of the California Code of Regulations limits airport noise near residential communities to minimize existing and future land use conflicts. Title 24 (Part 2) is concerned with transportation and industrial noise sources, and specifically regulates the maximum allowable interior noise level for hotels, motels, and multi-family housing. Title 24 (Part 2) also establishes standards for noise insulation and sound transmission control. In addition, the California Office of Noise Control has established Land Use Compatibility Guidelines (Table E-7), which recommend noise exposure thresholds for different land use categories.

U.S. Department of Housing and Urban Development (HUD). HUD has developed a set of noise policies for federal housing projects; these policies address various outdoor noise environments and recommend acceptable interior and exterior noise level goals.

### **County Noise Standards**

Alameda County General Plan Noise Element. The County's General Plan Noise Element (adopted in September 1975) provides general goals and policies designed to alleviate existing noise exposures and minimize future noise impacts. The element sets out the County's noise level requirements (which are also codified in the County Building Code), and states that construction noise should occur during times that are not noise-sensitive (generally between 8 A.M. and 6 P.M., Monday-Friday).

Alameda County Building Code. Section 3502 of the County Building Code ("Noise Insulation From Exterior Sources") includes noise level specifications for residential structures. The ordinance adopts a CNEL standard of 45 dB inside all new residential construction. Further, any proposed residential construction within a CNEL contour of 60 dB requires an acoustical analysis showing that the structure has been designed to limit intruding noise to the prescribed level of 45 dB.

It should be noted that these standards do not apply to public works projects on County roads which may affect existing development. The appropriate standards for such projects are the Caltrans standards for single family residences, which provide for an exterior standard of 65 dBA and an interior standard of 57 dBA.

Alameda County Noise Ordinance. The County Noise Ordinance, adopted in 1982, establishes exterior noise level standards for two categories of "receiving" land uses. These standards are summarized below in Table E-8.

Alameda County Zoning Ordinance. The County Zoning Ordinance sets performance standards with respect to exterior noise levels on industrial properties. No discernable noise from industrial districts is allowed to impact on adjacent residential districts. The ordinance also



TABLE E-7

## California Office of Noise Control Land Use Compatibility Guidelines

Land Use Category	Noise Exposure (dB)			
	Clearly Unacceptable <sup>1</sup>	Normally Unacceptable <sup>2</sup>	Conditionally Acceptable <sup>3</sup>	Normally Acceptable <sup>4</sup>
Residential (Low Density)	75	70-75	55-70	50-60
Residential (Multi-family)	75	70-75	60-70	50-65
Transient Lodging	80	70-80	60-70	50-65
Schools, Libraries Churches, Hospitals	80	70-80	60-70	50-70
Playgrounds, Neighborhood Parks	72.5	67.5-75	-	50-70
Golf Courses, Water Rec., Cemeteries	80	70-80	-	50-75
Industrial, Utilities, Agriculture	75-85	70-80	50-75	-

**Notes:** <sup>1</sup>Clearly Unacceptable--new construction should not be undertaken.  
<sup>2</sup>Normally Unacceptable--new construction should be discouraged. If construction does proceed, acoustic analysis to determine the insulation needed is required.  
<sup>3</sup>Conditionally Acceptable--new construction should be undertaken only after acoustic analysis and installation of noise insulation. Conventional construction with closed windows and fresh air supply systems or air conditioning will normally suffice.  
<sup>4</sup>Normally Acceptable--land use satisfactory, buildings need no special noise insulation.

**Source:** California Office of Noise Control, 1976.

TABLE E-8		
Alameda County Exterior Noise Level Standards (dBA)		
Receiving Land Use: Single or Multiple Family Residential, School, Hospital, Church, Public Library Properties		
Cumulative Number of Minutes in any 1-Hour Time Period	Daytime 7 A.M. - 10 P.M.	Nighttime 10 P.M. - 7 A.M.
30	50	45
15	55	50
5	60	55
1	65	60
0	70	65
Receiving Land Use: Commercial Properties		
30	65	60
15	70	65
5	75	70
1	80	75
0	85	80
Source: Alameda County Noise Ordinance, 1982.		

places restrictions on noise levels at quarries, and on home occupation noise within residential districts.

Incorporated Cities. The cities in the planning area have adopted the standards recommended by the State of California which require that new residential development not exceed 60 dBA Ldn for exterior noise levels and 45 dBA Ldn for interior noise levels. In addition to this basic limit, the City of Pleasanton applies noise criteria in siting and conditioning new land uses.

Airport Land Use Policy Plan. This document, adopted by the Airport Land Use Commission of Alameda County in July 1986, establishes Noise Impact Zones for all of the County's airports. Within these zones, a number of policies are applicable. These include: adherence to California airport noise standards and the state's General Plan noise element requirements; sound insulation to ensure that interior noise levels do not exceed 45 dB CNEL for new residential, educational, and health-related uses; and utilization of land use compatibility standards in evaluating proposed projects.

### Existing Noise Sources

With the exception of the three incorporated cities and the freeways passing through the planning area, the East County is predominantly agricultural and open space with few noise sources of its own. Many areas have the character of a quiet refuge, particularly in the protected smaller valleys. Overall noise levels in protected valleys generally range from 30 to 45 dBA Ldn (quite low). The levels are generally dependent on wind direction, wind speeds and atmospheric temperature profiles, as well as how close and how visible a significant noise source is.

The sources of community noise can be classified into two groups: *line sources* and *fixed point sources*. Line sources include freeways, highways, transit vehicles, railroads, aircraft, and transmission lines. Fixed point sources include industries, commercial establishments, individual residences, some recreational facilities, public transportation terminals, railroad yards, and airport ground facilities. The two types of noise affect people to varying degrees, depending on the characteristics of the source and the proximity and sensitivity of the receptors.

Figure 39 shows the location of major noise sources in the planning area (fixed-point sources are only shown if they are in or near an urbanized area); additional information on these sources is provided below.

Line Noise Sources. Freeways and arterial streets with heavy traffic are the most pervasively intense sources of noise in the area. The level of vehicular noise generally varies according to the volume of traffic, the percent of trucks, the speed of the traffic, and the distance from the source. The major noise-generating routes in the planning area are I-580, I-680, the Vallecitos Road segment of State Route 84, Dublin Boulevard, Stoneridge Drive, and Vallecitos Road; other notable noise-generating arterials include Foothill Road/San Ramon Boulevard, Stanley Boulevard, Hopyard/Dougherty Road, and Santa Rita/Tassajara Road. Railway operations and transmission lines in the planning area serve as additional sources of line noise.



Noise contours for this plan were generated using a noise prediction model which is based upon the Federal Highway Administration's Traffic Noise Prediction Model (FHWA RD-77-108) and incorporates the California Vehicle Noise Emission Level Curves. The FHWA method predicts the average hourly noise level along a roadway based on the number of vehicles, the speed of the vehicles, and the percentage of medium and heavy trucks. The noise contours referenced are based on an extremely conservative model which does not account for topographic features, vegetation, soundwalls, buildings, and other structural barriers which may attenuate sound levels. Contours in many areas will in reality be narrower, given the acoustical shielding which is provided in many places by the built and natural environments.

Figure 40 shows the contours for major sources of line noise in the planning area; Table E-9 provides a more comprehensive inventory of line noise sources, and lists the noise contour distances for each. Figure 41 shows projected contours for the same noise sources in the year 2010; Table E-10 provides the noise contour distances for the 2010 projections. Significant sources of line noise which are not covered in the aforementioned tables are discussed below.

**Lawrence Livermore National Laboratories (LLNL) and Sandia National Laboratories Livermore (SNLL).** Modeling of noise contours for streets in the vicinity of LLNL and SNLL was conducted in 1992 by the U.S. Department of Energy and the University of California. These streets included First Street, Vasco Road, Greenville Road, and East Avenue. The portions of these streets with the highest noise levels were Vasco Road between I-580 and Patterson Pass Road, and West Avenue west of Buena Vista Avenue. These two roadways had noise levels of 70 dBA within 65 feet of the roadway centerline. All of the modeled roadways had noise levels over 60 dBA at 50 feet from the centerline of the near travel lane.

**Transmission Lines.** High-powered transmission lines in the area generate a high frequency, cracking noise from discharges in the air ("corona") and the tower hardware ("microgap sparking"). These could be of concern for residential development along transmission line right-of-ways. Transmission lines may be audible for distances of 500 to 1,000 feet during humid periods (WPM Planning Team, 1989).

**BART.** Above-ground BART operations contribute substantially to ambient noise levels at land uses adjacent to BART tracks. Noise levels in areas affected by BART operations are as follows: the 70 dBA Ldn contour lies approximately 100 feet from the tracks, and the 60 dBA Ldn contour approximately 400 feet from the tracks (Environmental Science Associates, 1991). Although there are currently no rapid transit operations in the East County, BART plans to extend its services to Dublin by 1995 and to Livermore by 2010.

#### Fixed Point Noise Sources

Noise is a part of many industrial processes. Commercial business establishments have some potential for noise impacts due to their integration into residential areas. Most noise associated with commercial businesses is caused by traffic generation and auxiliary equipment such as refrigeration plants and air conditioning equipment. Most of these industrial and commercial

**TABLE E-9**  
**Nose Contour Distances (1990)**

Roadways		Distance to LDN Contour in Feet				
Street	Link	80 db.	75 db.	70 db.	65 db.	60 db.
<b>Dublin Boulevard</b>	San Ramon Road to Village Parkway	-	-	-	93	200
	Village Parkway to (Midpoint)*	-	-	-	81	175
	(Midpoint) to Dougherty Road	-	-	-	71	154
	Dougherty Road to (Road A)	-	-	-	-	61
<b>Stoneridge Drive</b>	Foothill Road to I-680	-	-	-	-	-
	I-680 to Johnson Drive	-	-	-	90	194
	Johnson Drive to Denker Drive	-	-	-	89	192
	Denker Drive to Hopyard Road	-	-	-	73	158
	Hopyard Road to Willow Road	-	-	-	55	119
	Willow Road to Hacienda Drive	-	-	-	54	117
	Hacienda Drive to W. Las Positas	-	-	-	-	103
	W. Las Positas to Santa Rits Road	-	-	-	-	84
<b>Vallecitos Road</b>	Santa Rita Road to (Point A)	-	-	-	-	71
	I-680 to Isabel Avenue	-	-	-	91	197
	Isabel Avenue to E. Vineyard Avenue	-	-	-	91	197
<b>I-680</b>	E. Vineyard Avenue to Holms Street	-	-	-	91	197
	Bollinger Canyon Road to Alcosta	-	105	227	489	1053
	Alcosta Boulevard to I-580	53	115	247	532	1147
	I-580 to Stoneridge Drive	-	104	225	485	1044
	Stoneridge Drive to Bernal Avenue	-	105	225	486	1046
	Bernal Avenue to Sunol Boulevard	-	107	231	499	1074
	Sunol Boulevard to Vallecitos Road	57	123	266	573	1234
<b>I-580</b>	Vallecitos Road to Plan Boundary	87	187	402	867	1867
	W. San Ramon Road to (Foothill)	86	185	399	859	1852
	(Foothill Road) to I-680	72	154	332	716	1543
	I-680 to Dougherty Road	87	187	402	867	1867
	Dougherty Road to Tassajara Road	93	199	429	925	1993
	Tassajara Road to Isabel Avenue	90	194	417	899	1938
	Isabel Avenue to N. Livermore	72	155	335	722	1555
	N. Livermore to First Street	75	161	348	749	1615
	First Street to VASco Road	82	176	379	816	1759
<b>Union Pacific Railroad</b>	Vasco Road to East of Vasco	67	145	311	671	1445
		-	-	100	240	517

\*Midpoint, Road A and Point A, etc. typically represent a location midway between two consecutive roadways.

Source: Charles Salter Associates, 1993

**TABLE E-10**  
**Noise Contour Distances (2010)**

Roadways		Distance to LDN Contour in Feet				
Street	Link	80 db.	75 db.	70 db.	65 db.	60 db.
Dublin Boulevard	San Ramon Road to Village Parkway	-	-	62	133	287
	Village Parkway to (Midpoint) <sup>1</sup>	-	-	51	109	235
	(Midpoint) to Dougherty Road	-	-	-	95	206
	Dougherty Road to (Road A)	-	59	128	276	595
	(Road A) to Hacienda Drive	-	52	113	243	523
	Hacienda Drive to Tassajara Road	-	58	124	268	577
	Tassajara Road to Fallon Road	-	-	107	231	497
	Fallon Road to Airway Boulevard	-	-	91	195	420
	Airway Boulevard to Collier Canyon	-	-	-	97	210
	Collier Canyon to East of Collier Canyon	-	-	55	118	255
Stoneridge Drive	I-680 to Johnson Drive	-	-	54	116	250
	Johnson Drive to Denker Drive	-	-	54	116	251
	Denker Drive to Hopyard Road	-	-	-	102	220
	Hopyard Road to Willow Road	-	-	-	88	190
	Willow Road to Hacienda Drive	-	-	-	72	155
	Hacienda Drive to W. Las Positas	-	-	-	93	201
	W. Las Positas to Santa Rita Road	-	-	-	83	179
	Santa Rita Road to (Point A)	-	-	-	68	146
	(Point A) to El Charro Road	-	-	-	-	89
	El Charro Road to (Point B)	-	-	-	62	134
	(Point B) to Isabel Avenue	-	-	-	98	211
Las Positas	Isabel Avenue to Arlington Road	-	-	-	94	203
	Arlington Road to Murrieta Boulevard	-	-	-	76	164
Isabel Avenue	I-580 to Las Positas Boulevard	-	-	99	213	459
	Las Positas Boulevard to Stanley Boulevard	-	-	95	205	441
	Stanley Boulevard to Concannon Road	-	-	77	165	355
	Concannon Road to E. Vineyard Avenue	-	-	67	143	309
	E. Vineyard Avenue to E. Vallecitos Road	-	-	58	126	271
Cayetano Parkway	I-580 to (Midpoint A)	-	-	-	102	220
	(Midpoint A) to (Road B)	-	-	50	108	233
	(Road B) to (Midpoint B)	-	-	-	97	210
	(Midpoint B) to Livermore Avenue	-	-	-	84	182
	Livermore Avenue to (Midpoint C)	-	-	-	67	144
	(Midpoint C) to (Road C)	-	-	-	54	116
	(Road C) to Vasco Road	-	-	-	65	140
	Vasco Road to East of Vasco Road	-	-	-	88	189
Vallecitos Road	I-680 to Isabel Avenue	-	-	83	179	387
	Isabel Avenue to E. Vineyard Avenue	-	-	-	102	221
	E. Vineyard Avenue to Holms Street	-	-	51	111	238
I-680	Bollinger Canyon Road to Alcosta Alcosta Boulevard to I-580	59	127	273	587	1265
	I-580 to Stoneridge Drive	63	137	294	634	1366
	Stoneridge Drive to Bernal Avenue	60	129	277	597	1286
	Bernal Avenue to Sunol Boulevard	62	133	286	617	1329
	Sunol Boulevard to Vallecitos Road	61	131	283	609	1312
	Vallecitos Road to Plan Boundary	70	151	326	703	1515
		106	228	490	1056	2275



TABLE E-10 (Continued)

## Noise Contour Distances (2010)

I-580	Plan Boundary to Foothill	106	228	490	1056	2275
	Foothill Road to I-680	93	201	434	934	2013
	I-680 to Dougherty Road	102	219	471	1015	2188
	Dougherty Road to Tassajara Road	111	239	515	1109	2390
	Tassajara Road to Isabel Avenue	118	255	549	1183	2550
	Isabel Avenue to N. Livermore	105	225	485	1045	2252
	N. Livermore to First Street (SR-84)	96	207	447	963	2075
	First Street to Vaco Road	99	213	458	987	2127
	Vasco Road to East of Vasco Road	83	179	387	833	1794
Union Pacific Railroad		-	-	100	240	517 <sup>2</sup>

**Notes:** <sup>1</sup>Midpoint, Road A and Point A, etc. typically represent a location midway between two consecutive roadways.  
<sup>2</sup>Same as existing data

Roadway noise levels were calculated using the Federal Highway Administration's Traffic Noise Prediction Model (FHWA-RD-77-108). In order to accurately reflect noise levels on California roads, California Vehicle Noise Emission Level curves were also incorporated into the model. Peak hour traffic volumes and average travel speeds were used to calculate the peak hour traffic volumes and average travel speeds were used to calculate the Peak Hour Leq, which was assumed to be equivalent to the day/night average sound level (DNL). Contour intervals were based on the calculated reference DNL at 50 feet from the roadway centerline. By applying a 4.5 dB reduction for each doubling of distance from the roadway centerline, the 60, 65, 70, 75 and 80 dB intervals were calculated.

**Source:** Charles Salter Associates, 1993

land uses are concentrated in Dublin, Pleasanton, and Livermore and are generally located along the I-580 corridor. Windfarms in the Altamont Hills also generate noise on windy days.

Fixed point noise sources can also include individual residences (through use of vehicles, power equipment, etc.), airport ground facilities, public transportation terminals, railroad yards, and some recreational facilities; concerts, special events and other activities generating amplified outdoor sound can also pose noise problems. Major fixed point noise sources in the planning area are discussed below.

**Lawrence Livermore National Laboratories (LLNL) and Sandia National Laboratories Livermore (SNLL).** Major sources of noise at LLNL and SNLL include vehicle traffic and stationary noise sources such as heating, ventilating and air conditioning equipment. The High Explosives Application Facility (an indoor high explosives research facility at LLNL that tests explosives), construction activities, and a pistol and firing range at SNLL are all considered to be occasional noise sources. The explosives facility creates impulse noise that can be felt/heard along Vasco Road (the western border of LLNL), and the firing range creates noticeable impulse noise at the southern end of the site.

Noise monitoring surveys conducted in 1991 around the exterior of LLNL and SNLL show that vehicular traffic was the dominant noise source, and noise levels measured near noise-sensitive receptor locations in the vicinity of the sites fall within the acceptable noise level range established by Alameda County and the City of Livermore (U.S. Department

of Energy and University of California, 1992). However, because the County and the City of Livermore do not have any regulations or guidelines for impulse noises such as those generated at the explosives facility and the firing range, it is difficult to fully assess the degree of conflict (if any) with surrounding land uses.

**LLNL Site 300.** Major noise sources within this site at the County's eastern border include high explosives testing, vehicular traffic, and stationary noise sources such as heating, ventilating and air conditioning equipment (cooling towers, pumps and fans, etc.). Construction activities and a pistol/firing range are considered to be occasional noise sources. Explosives testing can be heard at least a mile from the facility (U.S. Department of Energy and University of California, 1992).

**Livermore Municipal Airport.** Livermore Municipal Airport is one of three General Aviation Airports in Alameda County; it is the only such airport within the planning area. Although the airport itself lies within the city limits of Livermore, much of the land to the north, south and west of the facility is undeveloped and unincorporated. However, substantial portions of this unincorporated area are contained within the spheres of influence of Livermore, Dublin, and Pleasanton, and could eventually be annexed by these cities.

The airport periodically receives noise complaints from individuals residing within the vicinity of the airport. These complaints generally fall into one of the following categories: heavy, low-flying transport aircraft; business jet aircraft turning over the cities of Livermore or Pleasanton; and repetitive exposure from flight training activity (particularly on weekends). All noise complaints received by the airport have been from residents of either Pleasanton or Livermore. Since the vast majority of flights depart in a westerly direction, most of the complaints received from Pleasanton are due to takeoff noise. Livermore complaints, by contrast, stem from a combination of straight-in arrivals and pattern traffic.

Noise abatement procedures aimed at mitigating these impacts have been established by the Livermore Airport Commission. Included in these procedures are instructions to avoid impacts on noise-sensitive areas, which are defined as the eastern edge of Pleasanton (near El Charro Road) and the portions of Livermore east and southeast of the airport. 1991 noise contours for the airport and environs (see Figure 42) were prepared as part of a study for a proposed Airport Protection Area, which is discussed below.

The study for the proposed APA found that single-event noise levels for aircraft flying into and out of the airport were of sufficient magnitude to interfere with outdoor speech communications at close-in residential areas and in those undeveloped areas north of I-580 where development has been proposed. On occasion, these noise levels were deemed sufficient to interfere with indoor speech communication as well. Although aircraft activity was the dominant source of noise at most of the measurement locations, surface vehicular traffic was also found to be a major noise source.

**Airport Protection Area.** An Airport Protection Area (APA) is currently being considered by the Alameda County Airport Land Use Commission (ALUC). The APA



is a zone around the airport within which new residential development would be prohibited in order to protect the facility from encroachment of incompatible uses; it would also prohibit intensification of existing residential development within the zone. For a more detailed discussion of the proposed APA (and the airport in general) refer to the *Major Public Facilities and Utilities* background report in Section D.

One of the major issues surrounding the proposed APA is the noise impact of airport use on current and future development. If the APA is approved, it could affect areas targeted for annexation by each of the East County cities; development that is planned for these areas would be subject to the terms of the APA resolution. However, it should be noted that there are areas of existing and proposed residential development which are outside of the proposed APA and could still be subject to noise impacts. Of particular concern are areas to the west and northwest of the zone, which tend to be most directly affected by aircraft takeoff noise.

**Landfills.** Solid waste disposal and transfer facilities produce heavy equipment and truck noise. The access roads for landfills may be significant sources of community noise due to the large volume of vehicles. Landfills in the planning area include the Vasco Road and Altamont Sanitary Landfills. Analyses of these two sites indicate that the noise impact of existing operations are not significant, due primarily to the relative isolation of the landfill operation areas, the small number of sensitive receptors, and the small contribution of landfill-related traffic to the overall traffic on I-580.

It has been calculated that the 60 dBA CNEL standard would be met approximately 600 feet from a landfill if noise generation was limited to 8 hours in the daytime, or at least 1400 feet from the landfill if operations occurred 24 hours per day. It is estimated that a buffer zone of 2640 feet would be sufficient to allow standards to be met at the limits of the buffer zone (Brady & Associates, 1988).

**Construction Noise.** Construction activity in the planning area may result in temporarily elevated noise levels which could affect nearby residences. Noise from construction stems from activities such as ground clearing, earth-moving, and pile driving--activities which may generate noise levels of up to 90 dBA at a distance of 50 feet.

**Mining Noise.** Noise-generating activities associated with the mining of construction aggregates include both the mining itself and related functions such as processing and transportation. Noise generated by mining activity stems primarily from large machinery such as scrapers, bulldozers and earthmovers; processing noise centers around the processing plant itself; and transportation noise is produced by the trucks and railroads which are used in shipping the aggregate to other areas. Noise levels resulting from these operations can vary considerably, depending on the type and amount of activity, and the depth of the quarrying.

Noise sources noted in Figure 39 under "Quarry/Mining Operations" are limited to those which lie in or near urbanized areas; while other areas of mining activity exist in the East County, they are not included on the map due to the lack of sensitive receptors in adjacent



areas. Most of the sites identified on this map have received some complaints from nearby residents, and all of the sites fall between the bounds of the Quarry Subarea, located between Pleasanton and Livermore. Mining of construction aggregates in this area is likely to continue for the foreseeable future. The potential for noise impacts on adjacent residential areas will thus continue to exist, and the possibility of further residential encroachment means that noise impacts may eventually increase.

**Agricultural Noise.** Cultivated and uncultivated agricultural uses are primarily located in the northeastern and southern portions of the planning area. Agricultural activity such as early morning irrigation or night harvesting can produce unwanted noise that may lead to complaints from adjacent residences. Exterior noise generated at wineries occurs during the crush season and is usually less than 60 dBA at distances greater than 300 feet. There have been few complaints from residences near the vineyards in the South Livermore Valley area.

**Windfarm Noise.** There are two basic types of noise related to windfarm activity: mechanical and aeroacoustic. Windfarm noise is complex in that it consists of both periodic and random components, some of which persist over time while others are impulsive in character. Windfarm noise tends to be concentrated in the low end of the audible frequency spectrum, and is not strongly directional. Windfarm noise increases as wind speed grows--a function of the fact that aeroacoustic noise is approximately proportional to the square of wind speed.

Since the windfarms in Alameda County are generally located in remote, sparsely-populated areas near the Altamont Pass (see Figure 7), complaints regarding noise have been minimal. Noise problems have been further minimized by strict noise setbacks which have been established for wind turbines. Standard Conditions of Approval for windfarms require a setback of at least 1000 feet upwind from any existing dwelling, and 300 feet in any other direction from any existing dwelling or building site. In the event a reasonable noise complaint is received by the County--or that noise levels from a wind turbine exceed 55 dBA at the exterior of any dwelling unit within a minimum distance of 1000 feet--the complaint will be addressed via the steps outlined in the Standard Conditions of Approval of Windfarms.

### Noise-Sensitive Land Uses

Some land uses are more sensitive to ambient noise levels than others, due to the amount of noise exposure and the types of activities typically involved. Noise-sensitive land uses include residential (single- and multi-family residences), mobile home parks, motels and hotels, schools, libraries, churches, hospitals, nursing and convalescent homes, and some parks and cultural facilities. Commercial and industrial land uses, by contrast, tend to be less sensitive to noise.

As mentioned above, some recreational areas and open space preserves may be noise-sensitive uses (some may also be noise sources). Many open space preserves and major regional parks are located in the southern and western portions of the area (see the *Parks and Recreation*

background report in Section D for additional information). Residential land uses are concentrated around the three incorporated cities in the northern portion of the planning area. However, there are also scattered residences in the rural portions of the planning area.

## ■ TRENDS

### **Continued Growth Will Result in Increased Noise Levels**

The most significant trend contributing to increased noise levels in the East County is continued economic and residential growth, both inside and outside of the planning area. The population of the East County and adjacent areas of Contra Costa and San Joaquin counties is expected to continue its increase over the next 15 years, and commercial and industrial activity is projected to grow similarly. Increases in noise related to this growth are most evident along major transportation corridors. Rapid growth in the San Joaquin Valley and the eastern part of Contra Costa County has played a major role in the increase in noise along I-580 and I-680 as the new residents commute to jobs in and beyond the planning area. Another potential linear noise source is the BART line, currently planned to be extended to the Dublin/Pleasanton area by 1995, and to Livermore by 2010.

### **Increased Aircraft Activity Will Boost Noise Levels**

Livermore Municipal Airport has been one of the fastest growing airports in California. Aviation activity at the airport has increased from 163,650 operations in 1982 to 232,900 in 1991, and is projected to increase to 420,700 by 2011 (McClintock, Becker and Associates, 1992). The number of aircraft based at the airport has increased from 219 in 1974 to 607 in 1991. Increased use of the airport and increased residential development in the vicinity of the airport has led to more numerous complaints over aircraft noise, and this trend is likely to continue. For additional information on the airport, and the proposed Airport Protection Area, see the discussion under "Existing Conditions".

## ■ PLANNING ISSUES

### **Noise Prevention Techniques**

Because excess noise can cause negative psychological and physiological effects, it is important to have effective planning policies to control undesirable noise and ensure that development is planned to minimize adverse effects of noise. If it is not feasible to separate noise-sensitive land uses from noise-generating land uses, then mitigation should be undertaken in the form of noise prevention techniques. Planners, designers, developers and builders can reduce noise impacts by employing acoustical site planning, acoustical design, and acoustical construction methods. Some of the specific abatement measures that can be used are outlined below.



Setbacks. Noise impacts can be reduced by increasing the distance between sensitive receptors and noise sources. For example, the doubling of distance will generally reduce traffic noise approximately 5 dBA (assuming a clear sight-path between the roadway and the point of measurement).

Barriers. These may include walls, hills, fences, earth berms, or other devices which stand between the sound and the receiver. The effectiveness of these measures depends upon several local factors, such as the height of the barrier relative to the sight-path of the sound, distances of the barrier from the source and receiver, reflections of sound which diminish the barriers' effectiveness, etc.

Buildings. Buildings may also serve as noise barriers if they are stand between the sound and the receiver. Their effectiveness varies based on mass, shape, height and other factors (such as the percent of the building which fronts the street, the presence of other buildings, and the distance between source and receiver).

Plantings. Heavy, dense vegetation (approximately 100 feet deep) placed between source and receiver will reduce traffic noise by approximately 5 dBA. No clear sight-path should exist, and heavy underbrush may be required to provide attenuation of sound beneath tree branches.

Insulation. The insulative effects of building construction on noise varies based on materials used, distance, weather conditions, and temperature. State requirements for noise insulation are contained in Title 24 of the California Code of Regulations.

While the techniques described above can all be applied to circulation noise, other methods of noise abatement can also be used to perform this particular function. Planners can curtail the noise impacts of transportation infrastructure on sensitive land uses by methods such as: elevating or depressing highways; regulating speed limits; limiting vehicle access on certain routes at certain times; and providing for compatible land uses adjacent to highways and freeways.

### **Implementation Techniques**

Physical methods of noise minimization can be implemented through several categories of administrative techniques.

Zoning. Zoning is one of the most commonly-used methods for implementing noise control measures. It is typically implemented on a project-by-project basis as a specific development proposal proceeds through the application and approval process. However, it is also possible to take a more broad-based approach, looking at a larger area and taking steps to discourage or prevent conflicts from occurring. By identifying protection areas along known or potential noise sources, and by clearly delineating the appropriate types and densities of land uses that may occur within the protected areas-- coupled with appropriate noise standards--the likelihood of noise-related conflicts may be reduced.



Zoning provisions can be applied either as straight zoning categories or as overlay zones, and can be used in a number of ways to mitigate noise impacts:

- by regulating specific details of development design or construction;
- through permitting and special development techniques such as cluster and planned unit development;
- by defining the areas in which other local regulations are applicable; and
- through exclusion of typically incompatible uses from noise impacted areas.

Other land use controls. Land use controls other than zoning can also be used to achieve noise minimization. Subdivision ordinances can require acoustical site planning or noise barrier construction. Building codes may specify construction techniques and details (such as insulation and sealed windows). Health codes may establish noise level standards for habitable buildings (if they are exceeded, the building can be declared uninhabitable, or local laws may require an occupancy permit before a building can be used). The individual review of each building application is a special permit procedure which can be included in the zoning ordinance.

Public ownership/financial incentives. If noise-impacted land is owned by a local government, it can keep the land vacant or develop it with noise-compatible land uses. Financial incentives can also be used to mitigate existing or potential noise impacts; for example, undeveloped or underdeveloped land can be assessed at a low rate, reducing pressures on landowners to sell because of high property taxes. Local government can also provide educational and advisory services on noise compatibility measures to builders, developers, architects, etc.

While these techniques offer a variety of options for mitigating noise impacts, the inherent limitations of these methods should also be noted. Noise minimization through physical methods has by no means been honed to a precise science; for example, soundwalls along noisy transportation corridors do not always have the desired effects. Successful use of administrative methods can be also be difficult to achieve--particularly in rapidly urbanizing areas such as the East County, where newer uses are often incompatible with older ones (both from a noise standpoint and otherwise).

## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Prohibition of construction in areas which exceed applicable interior and exterior standards, unless suitable mitigation measures can be implemented to alleviate impact (e.g., modified building design or lot orientation, soundwalls, earth berms, landscaping, building setbacks, etc.)*

- *Notification of home buyers at the time of sale when a residence is near an existing/potential noise-generating use*
- *Consideration of implementation mechanisms such as dedication requirements, purchasing of open space corridors along transit rights-of-way, or similar conservation-oriented methods*
- *Requiring project-specific noise studies to assess actual and projected dBA noise contours for all individual generators within the project area boundary*

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## **Biological Resources**

### **■ INTRODUCTION**

The East County contains some of the most extensive contiguous open space lands remaining in all of Alameda County. These open space lands support a variety of plant communities and wildlife habitats resulting in a diverse flora and fauna. The continued expansion of urban development in the East County will result in the encroachment into, and potential loss of some of the plant communities and wildlife habitats that currently exist in the plan area. The purpose of this background report is to describe the existing biological resources in the East County and discuss current trends for the preservation and protection of these resources.

The biological resources within the East County, particularly in the northern portion, have been well-documented through numerous environmental impact reports and other studies prepared for projects proposed within the area. Such studies have included vegetation and wildlife resource inventories, plant community and wildlife habitat delineations, and site-specific surveys for rare, threatened and endangered species following accepted survey protocols. The California Natural Diversity Data Base (CNDDDB) administered by the California Department of Fish and Game (CDFG) maintains records of special status plants and animals as well as significant natural communities that occur throughout California. CNDDDB has mapped all of the special element occurrences which have been recorded from the East County.

This background report presents a compendium of existing information on biological resources gleaned from all of the sources listed in Table E-11. Figure 43 identifies the extent of area studied for each of the environmental documents listed in Table E-11.

### **■ EXISTING CONDITIONS**

The East County is located within the Diablo Range, a mountainous area which runs in a northwesterly to southeasterly direction and is part of the California Coast Range. The Diablo Range consists of fairly rugged mountains ranging in elevation from about 100 feet to 4,000 feet. Most mountain valleys are young and V-shaped while the intermountain valleys consist of coalescing alluvial fans, low terraces and flood plains. The Livermore and Amador Valleys, the largest of the coastal intermountain valleys, lie adjacent to each other in an east-west direction in the northwest and north central portion of the East County. The mountains north and east of the Livermore and Amador Valleys are typically moderately steep to steep and have well-rounded ridges while the mountains south of these Valleys are steep to very steep and the ridges are narrow. The Sunol, Vallecitos and La Costa Valleys are smaller valleys located in the central-west section of the planning area to the east and northeast of Niles Canyon and Mission Peak.



Most of the drainages within the East County flow into the Livermore and Amador Valleys. The main streams in the Livermore Valley are the Arroyo Mocho, Arroyo del Valle and Arroyo Las Positas, which flow in a westerly direction. The principal streams in the Amador Valley are the Alamo and Tassajara Creeks which flow in a southerly direction. All of these streams converge about 1 mile west of Pleasanton and form the Arroyo de la Laguna which meets with other streams of the Sunol Valley to form Alameda Creek. The northeastern portion of the East County drains into the San Joaquin Valley via Mountain House and Tesla Creeks. Most of the streams in the East County are intermittent, except Alameda Creek which maintains a small flow throughout the year.

The Livermore/Amador Valley is the focus of urbanization in the East County with the surrounding hillsides used primarily for cultivation, grazing, recreation and/or watershed lands. The microclimates created as a result of the differences in terrain between the valley and surrounding hills provide for the establishment of a variety of plant communities and associated wildlife habitats. For purposes of mapping, six major vegetation associations have been identified in the East County. The extent of each of these associations is delineated on Figure 44. Within each of these major vegetation associations are specific plant communities that occur as a result of the various microclimates created throughout the plan area. Identification of these communities is based on descriptions of terrestrial natural communities presented in Holland (1986).

The array of plant communities occurring in the East County support a diverse fauna. Some wildlife species are restricted to specific plant communities while others move freely through adjacent habitats. Following is a general description of each of the plant communities and associated wildlife habitats that have been identified in the East County. Also, a discussion of the where these communities and habitats within the East County and the plan subareas is provided.

### Grassland

Grasslands occur throughout the planning area but the largest contiguous portions of this habitat are found on the valley floor and the well-drained slopes of the surrounding hills. Two types of grassland communities have been identified in the plan area; non-native grassland and valley needlegrass grassland. Non-native grassland is likely the most prevalent community with smaller areas of valley needlegrass grassland occurring occasionally. The major vegetative components of the non-native annual grassland include grasses such as soft chess (*Bromus mollis*), red brome (*Bromus rubens*), wild oats (*Avena spp.*), ripgut brome (*Bromus diandrus*) and fescue (*Vulpia myuros*). In the spring, many of the annual grasslands are interspersed with a variety of native wildflowers typical of the inner coastal ranges. The most commonly found species of wildflowers in these grasslands include lupine (*Lupinus spp.*), fiddleneck (*Amsinkia spp.*), popcorn flower (*Plagiobothrys nothofulvus*), California poppy (*Eschscholzia californica*), owl's clover (*Orthocarpus purpurascens*) and clarkia (*Clarkia spp.*).

The valley needlegrass grasslands are found in small, discontinuous stands in the East County. These grasslands consists almost entirely of purple needlegrass (*Stipa pulchra*); a native perennial bunchgrass which was thought to dominate the valley grasslands once common

throughout California. The decline of the valley needlegrass grasslands has been attributed to a combination of factors including invasion by alien plant species, changes in the kinds of animals and their grazing patterns, cultivation, and a reduction in the frequency of rangeland fire (Barbour, 1977). Because only remnant stands of this plant community exist in California, Valley needlegrass grassland is considered a significant natural community and, as a result, its status and distribution is monitored by the California Natural Diversity Data Base (CNDDB). Currently, the CNDDB has records of 44 stands of Valley needlegrass throughout the state, none of these are within the planning area. However, several occurrences of this community have been reported near Bethany Reservoir by Jones & Stokes Associates (1987) and at LLNL Site 300 by Taylor and Davilla (1986).

Many wildlife species use grasslands for foraging and nesting. Reptiles such as the western fence lizard, common garter snake, and western rattlesnake breed in the annual grassland habitat (Basey and Sinclear, 1980). Mammals inhabiting grasslands include black-tailed jackrabbit, California ground squirrel, Botta's pocket gopher, western harvest mouse, California vole, badger and coyote. The federally endangered San Joaquin kit fox is also found in and adjacent to the annual grasslands (U.S. Fish and Wildlife Service 1983). Common birds known to breed in annual grasslands include burrowing owl, short-eared owl, and western meadowlark. It also provides important foraging habitat for turkey vulture, northern harrier, American kestrel, black-shouldered kite and prairie falcon (Mayer and Laudenslayer, 1988).

### Woodland

Woodland vegetation in the East County is found primarily in the hills and mountainous terrain of the western and southern portions of the planning area. In these areas, the moist microclimate created by the steepness and aspect of the slopes encourages the establishment of a woodland habitat dominated by oaks and intermixed with other broadleaved evergreen vegetation.

Three types of woodland plant communities are identified in the planning area; coast live oak forest, mixed evergreen forest, and riparian forest. While the coast live oak forest and mixed evergreen forest communities occur primarily in the hills, riparian forest is mostly associated with the Arroyos that flow through the valley floor. A brief description of the vegetation within each of these communities and the wildlife habitat they provide follows.

Coast live oak forest. The coast live oak forest community overlaps with the mixed evergreen forest in the canyons and steep hills of the East County, but the coast live oak community is typically found higher up on the slopes, away from the canyon bottoms. The vegetation components of this community tolerate the drier microclimate existing nearer the ridgetops. This plant community is dominated by coast live oak (*Quercus agrifolia*) with some California buckeye (*Aesculus californica*) and California bay (*Umbellularia californica*). The canopy closure tends to be moderately dense in this forest and the understory vegetation is mostly grassland with scattered shrubs of poison oak (*Toxicodendron diversiloba*).

Oak trees provide food, shade, shelter and nesting habitat for a variety of wildlife species. The oak mast (acorns) provides an important autumn food source for wildlife such as the acorn



woodpecker (*Melanerpes formicivorus*), dusky-footed woodrat (*Neotoma fuscipes*), and black-tailed deer (*Odocoileus hemionus columbianus*) (Zeiner et.al., 1990). Golden eagles and red-tailed hawks use the crowns of the oaks as nesting sites while other birds such as the western bluebird and American kestrel make their nests in trunk cavities. Many amphibian and reptile species live in the cool shady understory of the oaks and insects feed on the leaf litter and dead wood in this habitat.

Mixed evergreen forest. The mixed evergreen forest community occurs in canyon bottoms and cool east and north-facing slopes of the hills in the East County. This community differs from the coast live oak forest in that the canopy closure tends to be more dense and there is a greater diversity and density of understory vegetation. The canopy consists of coast live oak, California bay, big leaf maple (*Acer macrphyllum*) and madrone (*Arbutus menziesii*). Understory vegetation includes a diversity of shrubs such as poison oak, hazelnut (*Corylus cornuta*), creambush (*Holodiscus discolor*), and coffeeberry (*Rhamnus californica*).

The moist understory in this community provides critical summer retreat areas for amphibian species like the California newt (*Taricha torosa*). Other species such as the California slender salamander (*Batrachoseps attenuatus*) and the yellow-eyed salamander (*Ensatina eschscholtzi xanthopotica*) carry out their entire life cycle in the leaf litter of the woodland floor. The diversity of insect and reptile species inhabiting the understory of this community is likely greater than in the coast live oak forest due to the diverse vegetation composition. The types of mammals and birds using this habitat are similar to those found in the coast live oak forest.

Riparian woodland. Riparian woodlands occur throughout the East County along intermittent and perennial watercourses. The morphology of the channel has an effect on the assemblage of plant species that occur along these watercourses. Along creeks in hilly or mountainous terrain, the floodplain of the channel is restricted to a narrow zone along the creek edge. As a result, the canopy vegetation along these creeks consists of species less dependent on moisture provided in the riparian zone such as coast live oak, California bay and California buckeye. Along creeks in the bottomlands, the floodplain is more broad and, provided enough water flows in these drainages, can support a variety of more moisture-dependent canopy vegetation. California sycamore (*Platanus racemosa*), alder (*Alnus rhombefolia*), Fremont cottonwood (*Populus fremontii*), and willow (*Salix spp.*). These bottomland riparian communities have undergone a significant decline in California in recent years due to a variety of factors and therefore preservation of remnants of this community is a priority for several local and state agencies.

Remnants of bottomland riparian woodlands occur in the East County along reaches of several of the Arroyos. The upper reaches of the Arroyo Mocho are relatively undisturbed and retain a flat meandering floodplain with large sycamore trees and alder, Fremont cottonwood and willows where water is retained for longer periods. The Arroyo del Valle, below where it is dammed creating Lake del Valle also retains a flat meandering floodplain with sycamore and valley oak along the channel. In a reach of Arroyo del Valle just south of the Livermore city limits, the sycamore riparian habitat is the focus of a regional park and has also been designated as a significant natural community by CDFG. Much of the Arroyo Las Positas has been improved for flood control purposes resulting in a wide and deep channel. Though riparian woodland vegetation is sparse along the Arroyo Las Positas, emergent aquatic vegetation like



cattail (*Typha latifolia*) and bulrush (*Scirpus robutus*) has established in the channel. The upper reaches of the Arroyo Seco have steep-sided slopes that are vegetated with species from the adjacent grassland habitat. As the Arroyo flows northwesterly, the channel broadens and woodland tree species such as sycamore, valley oak and red willow occur. The Arroyo de la Laguna retains a dense and diverse riparian habitat along its course through the plan area. Several riparian trees, shrubs and herbs as well as emergent aquatic vegetation have established in the channel of Arroyo de la Laguna.

The riparian woodland community is used by a variety of wildlife which feed on the vegetation, drink from the stream, nest in the trees and find refuge in the shade from the exposure of adjacent grasslands. Since this community often occurs along a linear stream course, wildlife also use the riparian woodlands as travel corridors. Riparian woodlands provide valuable habitat for aquatic and terrestrial wildlife species.

### Scrub

Scrub communities generally occur on arid south-facing slopes and above woodlands on the ridges within the East County. Three types of scrub communities have been identified in the planning area; diablan sage scrub, coastal sage scrub and baccharis brushland. The vegetation composition in each of these communities is similar but typically chamise dominates the diablan sage scrub, california sage dominates the coastal sage scrub and coyote brush dominates the baccharis brushland.

The scrub communities in the East County provide habitat for the Alameda whipsnake, a state-listed threatened species. Due to the relatively warm temperatures and exposure in the scrub habitats, several snakes and lizards are found in these areas. Western rattlesnake (*Crotalis viridis*), common kingsnake (*Lampropeltis getulus*), western fence lizard (*Sceloporus occidentalis*), and alligator lizard (*Gerrhonoyus multicarinatus*) are common inhabitants of this community. The cover and foliage provided by the shrubs in this habitat support a number of birds including the wrentit (*Chamaea fasciata*), rufous-sided towhee (*Pipilo erythrophthalmus*) and California quail (*Callipela californica*). No mammals are restricted to this habitat but deer and grey fox use the vegetation year-round for cover and foraging.

### Cultivated Land

Cultivated lands in the East County are used for dry land agriculture, row crops, and vineyards. A detailed discussion of agricultural uses in the planning area is provided in the *Agriculture* background report in Section A.

Croplands and orchards provide habitat for rodents, a variety of birds, deer and rabbits. Evergreen orchards can be especially beneficial to wildlife during inclement weather in winter or hot summer periods. Irrigated orchards can also provide water and shade for wildlife in the vicinity. Some species of birds and mammals have adapted particularly well to the orchard and vineyard habitats and consequently have become agricultural pests. The efforts to control these pests has resulted in intensive management efforts such as fencing, the use of sound guns, trapping and poisoning and other techniques (Mayer, et al., 1990).

## Alkali Sink Scrub

Alkali sink scrub vegetation was once common throughout the central portion and western edge of the San Joaquin Valley and in valley bottoms of the inner Coast Ranges but it now only occurs in remnant stands in these areas. The alkali sink scrub vegetation in the East County is not extensive, occurring primarily around the Springtown area of the City of Livermore and east of the Altamont Hills near Mountain House Road. The CDFG considers alkali sink scrub a significant natural community because it supports plant and animal species not found in any other community and is declining in extent in California. Consequently, the CNDDDB is tracking occurrences of this community and currently lists 44 locations, five of which are located in the East County.

The alkali sink scrub vegetation in the East County has established in areas of highly alkaline soils with low permeability where the groundwater table is high. The soils in these areas are seasonally saturated and slow to drain thereby generally supporting vegetation distinct from surrounding grasslands or woodland. Characteristic plant species found in the alkali sink scrub community include, iodine bush (*Allenrolfea occidentalis*), alkali weed (*Cressa truxillensis*), salt grass (*Distichlis spicata*), seepweed (*Suaeda fruticosa*), pickleweed (*Salicornia subterminalis*), alkali heath (*Frankenia grandifolia*) as well as the federally endangered palmate-bracted bird's beak (*Cordylanthus palmatus*) and federal candidates for listing - hispid bird's beak (*Cordylanthus mollis* ssp. *hispidus*) and San Joaquin saltbush (*Atriplex patula* ssp. *spicata*). In the spring, the alkali sink areas are laden with a variety of annual wildflowers dominated by alkali goldfields (*Lasthenia platycarpa*) which cast a bright yellow hue on the landscape.

Ponding occurs in the winter and early spring in microtopographic depressions of the alkali sink. This seasonal ponding supports a specialized fauna which have adapted to the cyclic water regime. Wildlife adapted to this regime include the state-listed threatened tiger salamander (*Ambystoma californiense*) and three invertebrates proposed for federal listing; vernal pool fairy shrimp (*Branchinecta lynchi*), longhorn fairy shrimp (*Branchinecta longiantenna*) and California linderiella (*Linderiella occidentalis*). The alkali sink also provides habitat for the California ground squirrel, northern harrier (*Circus cyaneus*), burrowing owl (*Athene cunicularia*) and killdeer (*Charadrius vociferus*).

## Mixed Conifers

Coniferous vegetation in the East County is limited in extent to areas of higher elevation (up to 4,000 feet) in the southern portion of the planning area (Figure 44). This coniferous vegetation includes modest stands of digger pine (*Pinus sabiniana*), Monterey pine (*Pinus radiata*) and Bishop pine (*Pinus muricata*). The vegetation composition and wildlife use in these stands is not well described due to their relative inaccessibility. It is expected that wildlife which use these stands are likely the same species found in adjacent woodland, grassland and scrub habitats.

## Special Status Species and Significant Natural Communities

Special status species and significant natural communities considered in this report include:



- species listed or proposed for listing as rare, threatened, or endangered, or listed as candidates by the U.S. Fish and Wildlife Service (USFWS);
- species listed as rare or endangered by the California Department of Fish and Game (CDFG);
- animals designated as "Species of Special Concern" (CSC) by CDFG;
- plants occurring on lists 1A, 1B, and 2 of the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California (Smith 1988);
- high priority habitats that are described by Holland (1986) and are tracked by CDFG in its Natural Diversity Data Base.

Although a significant portion of the East County has been surveyed by biologists for various reasons, there are still large expanses of open space that have never been subject to that level of examination. In discussing the special status species and significant natural communities occurring in the East County, information was gathered from all the sources listed in Table E-11 and from interviews with biologists who have surveyed portions of the plan area. A list of the special status species and significant natural communities known to occur in the East County gleaned from all of these sources is provided in Table E-12. Since a large area of the East County has not been surveyed in detail, there are likely to be species found in the plan area that are not included in this list. However, the lands in the East County that are currently under the most pressure for urban development have been subjected to a level of examination adequate for providing recommendations in determining an Urban Growth Boundary.

It is the County's intent to maintain current records of special status species found and/or expected to occur within the planning area. The information compiled for this background report represents an initial effort toward that goal and will continually be updated as new information is reported.

### **Subareas**

West Dublin. The West Dublin Sub Area is topographically diverse, consisting of a series of steep-walled canyons and sharp-crested ridges. The canyon bottoms tend to be level but are deeply incised by intermittent streams which originate within the planning sub area. Most of the streams drain in a southwesterly direction into Eden Creek. The remaining streams drain in a southeasterly direction into Dublin Creek and residential developments in the City of Dublin.

The West Dublin Sub Area is dominated by grassland and woodland habitats with some scrub occurring near the ridgeline in two of the canyons. Mixed evergreen forest vegetation occurs on the north- and east-facing slopes and along the intermittent creeks that flow through the canyon bottoms. Riparian woodland, characterized by fremont cottonwood, sycamore and willow, is found adjacent to the drainage which flows through Hollis Canyon.

One special status species, Diablo Helianthella, is known to occur in the West Dublin Sub Area (Figure 45). Trapping studies for the Alameda whipsnake were conducted in March through June, 1989 for the for the Western Dublin Specific Plan/General Plan Amendment EIR. No Alameda whipsnakes were found during these trapping efforts.



East Dublin/Doolan Canyon. The East Dublin/Doolan Canyon Subarea is comprised of two distinct topographic areas; a valley plain and rolling foothills. The valley plain, which comprises the northern extent of the Amador Valley, lies along I-580 at the southern border of the subarea and the topography rises in a northeasterly direction to form gentle foothills and progressively steeper slopes. A series of ridgelines, trending in a general north-south direction and cut by intermittent streams, provides topographic relief throughout the foothill area. These foothills are part of the Tassajara Hills which stretch from San Ramon to Livermore and culminate at Mount Diablo, northeast of the East Dublin Subarea.

Cottonwood Creek and Tassajara Creek are the main drainages in the subarea and traverse the area in roughly a north-south direction. Each of these drainages has perennial flow and is fed by a number of smaller streams which create a dendritic (branching) drainage pattern throughout the subarea.

The East Dublin/Doolan Canyon Subarea contains a predominantly dry landscape of annual grassland vegetation and dry farming of hay and grain crops. Alkali grassland habitat occurs on alkaline clay soils and seep areas along the upper reaches of Doolan Canyon and the eastern tributary of Tassajara Creek near Tassajara Road. Northern riparian forest vegetation is well developed along Tassajara Creek and its upper tributaries. Stands of Arroyo willow are found scattered along an intermittent drainage which follows Fallon Road in the subarea. Isolated stands of non-native trees planted as windbreaks and for shade mark the locations of scattered homesteads in the subarea.

A number of surveys for special status plant and animal species have been conducted in recent years within the East Dublin/Doolan Canyon Subarea. Most of these surveys were completed for the Dublin General Amendment Plan and Specific Area Plan Biological Assessment prepared in 1989 and subsequent environmental documents. To date, no special status plant species have been identified in the subarea. Special status animals known to occur in this subarea include the red-legged frog and western pond turtle. The red-legged frogs have been found inhabiting springs, impoundments, windmill cisterns, pools and small runs in Cottonwood Creek and two tributaries of Tassajara Creek. Western pond turtles have been identified at two locations along Cottonwood Creek in the subarea. An active golden eagle nest was also identified in the subarea in 1989. Surveys for the San Joaquin kit fox conducted in the East Dublin/Doolan Canyon subarea in April and June, 1989 failed to document the presence of kit fox in the area.

North Livermore. The North Livermore subarea includes all of the Las Positas Valley and portions of the hillsides which border this valley to the north, west and east. Las Positas Valley is oriented in a north-south direction and drainage through the valley is generally to the south into Arroyo Las Positas. Arroyo Las Positas flows east to west along the southern portion of this subarea and receives surface water from several intermittent drainages including Collier Creek, Altamont Creek, and Cayetano Creek. The Springtown alkali sink, a complex mosaic of vernal pools, mounds, and alkali scalds is also located within the North Livermore subarea.

Most of the Las Positas Valley is used for dryland farming hay and grain crops and the adjacent hillsides are dominated by annual grasslands. Scattered trees occur along some of the drainages and associated with the residences in the area. Alkali sink vegetation occurs in the Springtown

area and in remnant patches throughout the valley where land use practices have not significantly altered this habitat. Within the North Livermore subarea, Arroyo Las Positas has only intermittent stands of woodland vegetation but emergent wetland vegetation is commonly found within the channel. Some riparian woodland vegetation is supported along the lower reach of Cayetano Creek, above its confluence with Arroyo Las Positas.

There are several special status plant and animal species known to occur in the North Livermore subarea. The alkali sink habitat supports two special status plant species; the palmate bracted bird's beak (*Cordylanthus palmatus*) and the hispid bird's beak (*Cordylanthus mollis* ssp. *hispidus*). Additionally, the seasonal ponds located in the alkali sink area have been found to provide habitat for the California Linderiella, vernal pool fairy shrimp and the California tiger salamander (Launer, 1992). The annual grasslands remaining in the valley and surrounding hillsides are known to support the burrowing owl.

The CNDDDB has a reported sighting in 1975 of the San Joaquin kit fox in Collier Canyon in the northwest portion of the subarea. More recent surveys for the species conducted in 1990 and 1991 by Harding Lawson Associates for the Stonechase Development project within the Las Positas Valley failed to document the presence of San Joaquin kit fox in the area.

Altamont. The Altamont subarea includes the Altamont Hills which trend in a north-south direction separating the Livermore-Amador Valley from the San Joaquin Valley. The Altamont Hills are moderately steep to steep, have well-rounded ridges and are characterized by grass-covered rolling hills with typical elevations ranging from 400 feet to over 1000 feet. Most of the major drainages within the Altamont hills flow west to the Livermore-Amador Valley or to the east towards the San Joaquin Valley. The Altamont subarea includes Crane Ridge along the southern border, Patterson Pass and Brushy Peak.

The topography and soil conditions in the hills and drainages of the Altamont Range, together with the prevailing marine air masses moving over the area, provide for a variety of microclimatic conditions. The presence of these microclimates, along with the variations in soil chemistry and infrequency of surface water supplies contribute to the development of a diverse but localized array of plant communities. Grasslands dominate the Altamont Hills but there are also localized areas of alkali sink, oak woodland, riparian woodland and marsh habitats. Brushy Peak supports scattered stands of coast live oak within the rock outcrops near the ridgetop.

The Altamont Pass area features the largest wind turbine development in the world with over 7,000 turbines harvesting the winds that flow over the rolling hills and grasslands in the area. Studies conducted in 1989 through 1991 for the California Energy Commission on the effects of windfarms on the activities, habitat and death rate of birds concluded that the number of avian mortalities attributed to wind turbines and associated facilities was significant. Recommendations for minimizing windfarm bird fatalities have been provided to the County and these recommendations are currently being reviewed and/or utilized in developing siting criteria for future windfarm locations. The County is also considering implementation of suggested recommendations to reduce avian mortalities associated with existing facilities.



Special status species known to inhabit habitats within the Altamont subarea include the burrowing owl, tiger salamander, curve-foot hygrotus diving beetle, San Joaquin pocket mouse, and California horned lizard. There is an historical sighting of showy indian clover reported 10 miles west of Tracy, just east of Kellogg Creek watershed, but this species is currently believed to be extinct.

Surveys conducted for the San Joaquin kit fox in 1988 on the Castlewood Development site, on Laughlin Road between Dyer Road and Vasco Road found the species using the area (Hopkins, 1992). In a biological resource study conducted in 1991 for the Altamont Sanitary Landfill Expansion, two kit fox were sighted within the proposed expansion area. In 1986 and again in 1991, surveys for the kit fox were conducted at the Lawrence Livermore National Laboratory Livermore site and Site 300 as well as the Sandia National Laboratory Livermore site. Each of these surveys failed to find kit fox using the lands covered by these facilities.

Mountain House. The Mountain House subarea includes the eastern foothills of the Altamont Hills and a portion of the level San Joaquin Valley. Mountain House Road marks the transition between the valley floor and the rolling foothills. Several of the drainages in this subarea originate in the Altamont Hills and flow east towards the valley. Mountain House Creek flows west to east through the southern portion of the subarea. The Delta Mendota Canal runs north to south at the eastern base of the foothills and Bethany Reservoir is situated in the northeastern portion of the subarea.

The low foothills in the western portion of the subarea are used for grazing and for windfarming and the valley is lined with irrigated croplands. The remaining natural areas in the subarea contain mostly grasslands with scattered islands of alkali sink vegetation. Northern claypan vernal pool habitat occurs in association with the alkali sink communities in the subarea.

Surveys for special status species have been conducted within the Mountain House subarea for the Vasco Road and Utility Relocation Project (1990) and the Mountain House New Town Project (1991). Three special status plant species have been located in the subarea. San Joaquin saltbush occurs in alkali sink habitat near Mountain House and Grant Line Roads. Mason's lilaeopsis has been found in one location near Hammer Island, Southeast of Clifton Court Forebay. Caper fruited tropidocarpum was reported historically in the vicinity of Mountain House (1932) but recent surveys (1990) failed to locate this species again in that area. Several individuals of red-legged frog were reported along the Mountain House Creek in the subarea.

The burrowing owl and curve-foot hygrotus diving beetle are also known to occur in the subarea. Surveys for the San Joaquin kit fox were conducted for the environmental documents listed above and by CDFG in 1983 and EBRPD in 1992. All these surveys found kit fox using portions of the subarea, particularly in the vicinity of Bethany Reservoir.

South Livermore Valley. The South Livermore Valley Subarea extends from the current southern limits of the City of Livermore to the base of the hills that define the southeast edge of the Livermore Valley. The subarea is mostly flat but gives way to gentle grassy foothills then to steeper slopes in the southern portion of the area. Four intermittent streams, generally flowing in a northwesterly direction, drain the subarea and the hills to the south and east. The largest



drainage is the Arroyo del Valle which is dammed just south of the subarea forming Lake del Valle. The other drainages are the Arroyo Mocho, Arroyo Seco and Arroyo Las Positas.

Cultivated lands dominate the South Livermore Valley subarea. Vineyards, walnut and olive orchards, annual crops such as dry beans and hay comprise a major portion of the subarea. The remaining lands are primarily grasslands that are fenced and used for grazing. Portions of the Arroyo Mocho and Arroyo del Valle retain broad, flat floodplains that support extensive stands of mature sycamore trees, and alder, fremont cottonwood, and willow where water pools for longer periods.

No special status plant species are known to occur within the South Livermore Valley Subarea. The Sycamore alluvial habitat occurring along the Arroyo Mocho in the vicinity of Sycamore Park has been designated a significant natural community by CDFG. Several occurrences of the California tiger salamander have been reported within the subarea along the Arroyo Seco, near Tesla, Vasco and Greenville Roads and within the proposed Ruby Hill development project in the western portion of the subarea. Burrowing owls have also been observed in the pasturelands of the subarea.

South Pleasanton. This subarea lies south of the Pleasanton City limits and contains a series of steep ridges and valleys that trend northeast in the eastern portion of the subarea and northwest in the western portion. Several drainages, situated in the valley bottoms drain the subarea in two directions. Drainages in the eastern portion of the subarea empty into Arroyo Del Valle while drainages in the western portion flow westerly into Arroyo de la Laguna. Vallecitos Valley, a small northwesterly trending valley, is situated at the southern boundary of the South Pleasanton subarea.

Vegetation in the subarea is predominantly annual grassland with woodlands on the north-and east-facing slopes and in the canyon bottoms. Some scrub habitat is also found on drier sites near the tops of the ridges. Remnants of riparian woodland vegetation have only been identified along the upper reaches of Sycamore Creek in the South Pleasanton subarea.

Golden Eagle and black-shouldered kite have been observed in the northeastern portion of the South Pleasanton subarea. However, no other occurrences of Special Status Species have been recorded within the subarea.

West Pleasanton. The West Pleasanton Subarea is characterized by a northwest trending sequence of steep ridges and narrow valleys. Sunol Ridge dominates the topography of the area reaching 1,900 feet in elevation in the southern portion of the area. Sunol Ridge is flanked by Palomares Canyon to the west and Sinbad Creek Valley to the east. Pleasanton and Main Ridges separate the Sinbad watershed from the Amador Valley and Pleasanton to the east, joining Sunol Ridge in the northern portion of the subarea. Palomares Creek and Dublin Canyon drain the northwest portion of the subarea, together flowing into San Lorenzo Creek and the Don Castro Reservoir above Hayward. Devaney and Tehan Canyons drain the northeast portion of the subarea, flowing into the Arroyo de la Laguna. Characterized by mostly steep and wooded hillsides with flatter areas of grasslands located on ridgetops and stream valleys. The subarea

is drained by a series of intermittent streams that ultimately flow into San Francisco Bay through Alameda Creek and to a lesser extent, San Lorenzo Creek.

Predominant vegetation within the subarea includes non-native grassland and coast live oak forest. Grassland habitat occupies ridgetops and shoulders of rolling hills and the upper portion of the Sinbad Creek drainage. Coast live oak occurs on moderate to steep slopes in lateral canyons and drainages. Patches of diablan sage scrub occur scattered on the south facing slopes above Palomares Road within Devaney Canyon and adjacent drainages.

Two trapping studies have been completed for the Alameda whipsnake within the West Pleasanton subarea. One of the trapping efforts completed in April, 1991 yielded one Alameda whipsnake on the Moller Ranch, south of the I-580/I-680 interchange. The other study completed in April through June, 1990, approximately four miles south of the I-580/I-680 interchange and west of Foothill Road failed to find any individuals of the Alameda whipsnake. No other special status species or significant natural communities are known to occur in the West Pleasanton subarea.

Sunol Valley. Like the West Pleasanton Subarea, the Sunol Valley subarea is characterized by a northwest trending sequence of steep ridges and narrow valleys. The Sunol Valley subarea includes two major ridgelines, Sunol Ridge and Pleasanton Ridge. The Sinbad Creek Valley lies between the two ridges and meets the Sunol Valley at Niles Canyon. Sinbad Creek receives drainage from both ridges and directs it south towards Alameda Creek. The Arroyo de la Laguna receives drainage from the east slope of the Pleasanton Ridge and also flows south to its confluence with Alameda Creek. Much of the area contained within the Sunol Valley subarea is controlled by the San Francisco Water Department and the East Bay Regional Park District. The Water District lands are used for watershed management and the EBRPD lands are part of the Sunol Regional Wilderness.

Descriptions of the plant communities and wildlife habitats occurring in this subarea are not well documented. However, in reviewing mapping efforts completed for this study, it appears that woodlands dominate the subarea and grasslands occur near the ridgetops and on the drier west-facing slopes. Cultivated lands dominate the Sunol Valley and scrub habitat is found scattered throughout the woodland on drier sites near the ridgetops. Riparian woodland occurs along the length of the Arroyo de la Laguna through the subarea. The Arroyo supports a dense and diverse woodland vegetation including sycamore, alder, cottonwood and willows as well as a variety of understory riparian vegetation.

The only special status species known to occur in the Sunol Valley subarea is the tricolored blackbird. This species has been observed along Alameda Creek in the Sunol Valley.

South Ridgelines. The South Ridgelines subarea is the largest subarea within the East County. This subarea comprises all of the ridgelines south of the Livermore Valley and extends to the Santa Clara County Line. The ridgelines are generally oriented in a north-south direction and contain a series of steep ridges and valleys. Six prominent ridges occur within the subarea including Oak Ridge, Apperson-Valpe Ridge, Rocky Ridge, Rowell Ridge, Cedar Mountain Ridge and the ridge including Mission and Monument Peaks. All of these ridges consist of



heavily wooded north- and east-facing slopes and south- and west-facing slopes with scrub, grassland and scattered oak vegetation.

The major drainages in the subarea include Indian, San Antonio and La Costa Creeks which empty into San Antonio Reservoir, Alameda Creek which is diverted into the Calaveras Reservoir, and Arroyo Mocho which drains into the Livermore Valley. Lake del Valle is also in the subarea and is fed by the upper reaches of Arroyo del Valle. San Antonio Reservoir is surrounded by grassland with scattered trees of valley oak and live oak. The reservoir attracts a number of wintering waterfowl, bald eagles and is frequented by the introduced tule elk in the area. Calaveras Reservoir possesses very little shoreline and is bordered by grasslands with scattered oak trees as well as woodlands. Wintering waterfowl, bald eagles and gulls are also found around this reservoir. Lake Del Valle is banked on the east with habitat similar to San Antonio Reservoir but also includes blue oak along its shoreline. The western bank is covered with thick oak woodland with a few stands of digger pine. Lake Del Valle is frequented by boat traffic year round.

The South Ridgeland subarea contains the EBRPD lands of Sunol Regional Wilderness, Ohlone Wilderness and Del Valle Recreation Area. The subarea also includes watershed lands controlled by the San Francisco Water District surrounding San Antonio and Calaveras Reservoirs.

Several special status species have been observed at sites within the South Ridgeland subarea. The Alameda whipsnake, Mt. Hamilton thistle and talus fritillary have been observed along Mines Road and the Arroyo Mocho. Several locations of red-legged frog and California tiger salamander are recorded from the EBRPD Ohlone Wilderness. Bald eagle have also been observed around Lake Del Valle and San Antonio Reservoir.

Quarries. The Quarries subarea is situated between the cities of Livermore and Pleasanton. This subarea has been greatly modified from its natural state through decades of cultivation and mining. The area is relatively flat and traversed by the Arroyo Mocho and Arroyo del Valle which are under active quarrying currently. The remaining lands within the subarea are primarily cultivated or grazed. The reaches of the Arroyo del Valle that are not currently being quarried retain riparian vegetation consistent with bottomland riparian woodlands described previously. The Arroyo Mocho carries seasonal water but is channelized and devoid of vegetation in this subarea. The presence of water in the settling ponds and other quarry pits attracts waterfowl, such as blue herons, which would otherwise not occupy the area.

No special status species have been identified within the Quarries subarea. Once quarrying activities cease and the series of lakes is left behind and enhanced, they may attract some of the species known to occur around the Reservoirs in the South Ridgeland subarea such as the bald eagle.



## ■ TRENDS

### **Development in flat grassland areas**

The expansion of urban development within the East County has been focused on the flat valley floor around the existing communities of Livermore, Pleasanton and Dublin. Development of the valley has lead to the loss of natural plant communities including grasslands, alkali sink and bottomland riparian woodlands. While city and county policies have restricted development on the hillsides and provided protection for woodland habitats, particularly in the vicinity of Pleasanton Ridge, the grasslands of the valley and surrounding hills to the east and north have not been afforded the same protection.

### **New focus on biological diversity**

The agencies responsible for monitoring biological resources in California have developed "no net loss" policies regarding riparian and wetland habitats and other natural communities deemed significant. Coast live oak woodlands have always been considered an important habitat for wildlife and activities proposed within these areas have been subject to careful review by these same resource agencies. Historically, the loss of grassland habitat has not been monitored or subjected to the same kind of careful review as other habitats unless a particular area was found to support special status species. However, grassland loss is of more concern to the resource agencies recently due to their focus on maintaining biological diversity in California.

### **Regional planning for biological resources**

Regional planning for biological resources is being initiated in several Counties throughout California. The reasons for this regional direction are many, but in particular, the biological community and the County planners have seen an increase in disjunct islands of open space that are dedicated to the local jurisdictions with individual development projects through the project approval process. These disjunct islands are usually limited in extent to the project property boundary, they are immediately adjacent to development, and they are difficult to manage. All these factors limit the value of these areas for indigenous wildlife. In determining where the Urban Growth Boundary is to be delineated in East County, the County should consider each of the trends discussed above and develop policies that will provide for growth and maintain the biological diversity which currently exists in the plan area.

## ■ PLANNING ISSUES

The biological diversity exhibited in the variety of plant communities and wildlife habitats in East County should be maintained. In order to do this, designated open space lands should include habitats that are representative of all of the vegetation associations which currently exist in East County. Additionally, these open space lands should comprise large contiguous areas that are not easily encroached into by urbanization. The County should establish policies for designated open space lands that will ensure a variety of habitats are represented and that these lands will remain as open space.

The riparian woodland habitat present along the Arroyos within East County should be preserved. These areas are described above and include reaches along the Arroyo Mocho, Arroyo del Valle, Arroyo Las Positas, and Arroyo de la Laguna. Other drainages that should be considered for preservation are Tassajara Creek, Cottonwood Creek and Cayetano Creek because they could provide a natural movement corridor for wildlife from open space lands into the Arroyos. The widths of these corridors should be developed based on the morphology of the existing channel, proposed adjacent uses and the function of the corridor.

The East County Area Plan should incorporate policies regarding the preservation of biological resources that have been adopted by the cities of Dublin, Livermore and Pleasanton. The Plan should also follow biological resource management guidelines instituted by the EBRPD on its parklands and by the San Francisco Water Department on its watershed lands.

### ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Establishment of open space areas specifically for indigenous vegetation and wildlife (i.e. biological open space)*
- *Development of a funding mechanism for the acquisition and management of biological open space areas*
- *Provision of management guidelines for designated biological open space*
- *Protection of other large contiguous open space areas outside of urban development limits*
- *Establishment of specific biological survey protocols for proposed activities within areas designated for development*
- *Protection of existing riparian corridors*
- *Adherence to management guidelines developed by the San Francisco Water Department for its watershed lands in the planning area*
- *Adherence to resource management policies developed by the East Bay Regional Park District for Sunol Wilderness, Ohlone Wilderness, and Del Valle Recreation Area*
- *Encouraging preservation of areas known to support special status species*
- *Minimization of the impact of wind turbine operations on bird populations*
- *Incorporation of policies regarding woodland preservation similar to those established by the City of Pleasanton*

TABLE E-11

*Data Sources for Biological Resources in East County*

- ◆ *Draft EIS/EIR for Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories*, U.S. Department of Energy and University of California, February 1992.
- ◆ *Vasco Road and Utility Relocation Project Draft EIR*, Contra Costa Water District, February, 1990.
- ◆ *South Livermore Valley Area Plan Draft EIR*, Alameda County, June, 1992.
- ◆ *North Livermore General Plan Amendment Draft EIR*, City of Livermore, January 30, 1992.
- ◆ *East Dublin General Amendment Plan and Specific Area Plan, Draft Biological Assessment*, Wallace, Roberts & Todd, July, 1989.
- ◆ *Altamont Hills Landfill Program Draft EIR*, Alameda County Waste Management Authority, October, 1988.
- ◆ *West Pleasanton Sphere of Influence Study Draft EIR*, April, 1990.
- ◆ *Western Dublin Specific Plan/General Plan Amendment Draft EIR*, December, 1991.
- ◆ *Ruby Hill Development GPA and 1837 Zoning Unit Draft EIR and Addendum*, November, 1989; *Addendum*, May, 1990; *Response to comments*, September, 1990.
- ◆ *Kaiser Sand and Gravel Company Surface Mining Permit and Reclamation Plan (SMP-31) Draft EIR*, August, 1991.
- ◆ *Altamont Sanitary Landfill Expansion Biological Resource Study and Preliminary Impact Assessment*, Bryan A. Stirrat and Associates, September 24, 1991.
- ◆ *San Joaquin Kit Fox Survey Near Altamont Raceway*, prepared for the Sierra Club by Gary Beeman, February 7, 1989.
- ◆ *East Bay Regional Park District Data for Sunol Wilderness and Ohlone Wilderness*, data provided by Joseph DiDonato, EBRPD.
- ◆ *Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas Final Report*, California Energy Commission, March, 1992.
- ◆ *Tri-County Wind Energy Mitigation Compliance Monitoring Program Draft Working Paper #1*, Alameda, Contra Costa and Solano Counties and the California Energy Commission, July 27, 1992.
- ◆ *Unusual and Significant Plants of Alameda and Contra Costa Counties*, California Native Plant Society, East Bay Chapter. March 1, 1992.



TABLE E-11 (Continued)

## Data Sources for Biological Resources in East County

- ◆ *Status of Rare, Threatened and Endangered Vascular Plants in Alameda and Contra Costa Counties, Second Edition*, California Native Plant Society, East Bay Chapter Rare Plant Committee, October 8, 1991.
- ◆ *Raptor Populations of Southern Alameda County*, Predatory Bird Research Group, September, 1987.
- ◆ *1:62,500 scale "Natural Cover Types, Basic Data for the Land Use Portion of the Master Plan, Alameda County, California,"*, Alameda County Planning Department, *Natural Cover Data from Vegetation Type Survey made by California Forest and Range Experiment Station*, U.S. Forest Service.
- ◆ *1:62,500 scale "Element Occurrences in Alameda County"*, California Department of Fish and Game, Natural Heritage Division, July 1992.
- ◆ *California Natural Diversity Data Base RAREFIND program administered by California Department of Fish and Game*, Data provided by Harding Lawson Associates, July 1992.
- ◆ *Soil Survey - Alameda Area, California, Series 1961, No. 41.*, U.S. Department of Agriculture, Soil Conservation Service, 1966
- ◆ *Studies of Cordylanthus palmatus at the Springtown Alkali Sink, Livermore, California*, Center for Conservation Biology, Stanford University, 1992.
- ◆ *A Management Plan for the Springtown Alkali Sink Wetlands and the Endangered Plant Cordylanthus Palmatus*, Philip Williams & Associates, 1988.
- ◆ *San Joaquin Kit Fox Surveys 1990 and 1991, Stonechase Project, Livermore, California*, Harding Lawson Associates, June, 1992.

TABLE E-12

## Special Status Plant and Animal Species Known to Occur in the East County

Common Name	Scientific Name	Status
<b>Plant Species</b>		
Large-Flowered Fiddleneck	<i>Amsinckia Grandiflora</i>	FE, SE, 1B
San Joaquin Saltbush	<i>Atriplex Patula Ssp. Spicata</i>	C2, 3
Palmate-Bracted Bird's-Beak	<i>Cordylanthus Palmatus</i>	FE, SE, 1B
Mt. Hamilton Thistle	<i>Cirsium Campylon</i>	C2, 1B
Hispid Bird's Beak	<i>Cordylanthus Mollis Ssp. Hispidus</i>	C2, 1B
Mt. Diablo Buckwheat	<i>Eriogonum Truncatum</i>	C2, 1A
Diamond-Petaled California Poppy	<i>Eschscholzia Rhombipetala</i>	C2, 1B
Stinkbells	<i>Fritillaria Agrestis</i>	3C, 4
Talus Fritillary	<i>Frisillaria Falcata</i>	C2, 1B
Diablo Helianthella	<i>Helianthella Castanea</i>	C2, 1B
Mason's Lilaeopsis	<i>Lilaeopsis Masonil</i>	C2, SR, 1B
Showy Indian Clover	<i>Trifolium Amoenum</i>	C2, 1A
Caper-Fruited Tripidocarpum	<i>Tropidocarpum Capparideum</i>	C2, 1A
<b>Animal Species</b>		
<b>Invertebrates</b>		
Longhorn Fairy Shrimp	<i>Branchinecta Longiantenna</i>	FPE
Vernal Pool Fairy Shrimp	<i>Branchinecia Lynchi</i>	FPE
California Linderiella	<i>Linderiella Occidentalis</i>	FPE
<b>Insects</b>		
Curved-Foot Hygrotus Diving Beetle	<i>Hygotus Curvipes</i>	FPE
<b>Amphibians</b>		
California Tiger Salamander	<i>Ambystoma Californiense</i>	C2, CSC
California Red-Legged Frog	<i>Rana Aurora Draytoni</i>	C2, CSC
Foothill Yellow-Legged Frog	<i>Rana Boylii</i>	CSC
<b>Reptiles</b>		
Northwestern Pond Turtle	<i>Clemmys Marmorata Marmorata</i>	FT
Southwestern Pond Turtle	<i>Clemmys Marmorata Pallida</i>	C2, CSC
Alameda Whipsnake	<i>Masticophis Lateralis Euryzanthus</i>	C2, ST
California Horned Lizard	<i>Phrynosoma Caronatum Frontale</i>	CSC

TABLE E-12 (Continued)

## Special Status Plant and Animal Species Known to Occur in the East County

Common Name	Scientific Name	Status
<b>Birds</b>		
Cooper's Hawk	<i>Accipiter Cooperii</i>	CSC
Sharp-Shinned Hawk	<i>Accipiter Striatus</i>	CSC
Tircolored Blackbird	<i>Agelaius Tricolor</i>	C2, SCE
Golden Eagle	<i>Aquila Chrysaetos</i>	CSC
Burrowing Owl	<i>Athene Cunicularia</i>	CSC
Northern Harrier	<i>Circus Cyaneus</i>	CSC
Black Shouldered Kite	<i>Elanus Caeruleus</i>	CSC
Peregrine Falcon	<i>Falco Peregrinus Anatum</i>	FE, SE
Prarie Falcon	<i>Falco Mexicanus</i>	CSC
Bald Eagle	<i>Hallaectus Leucocephalus</i>	FE, SE
<b>Mammals</b>		
San Joaquin Pocket Mouse	<i>Perognarthus Inornatus Inornatus</i>	C2
American Badger	<i>Taxidea Taxus</i>	CSC
San Joaquin Kit Fox	<i>Vulpes Macrotis Murica</i>	FE, ST



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## **Cultural Resources**

### **■ INTRODUCTION**

Cultural resources represent the social, economic, physical and political history of the East County. They play an important part in defining the unique character of the East County and building an understanding of its past. A cultural resource may take many forms including: a structure, such as a building or bridge; a group of buildings, such as a historic commercial district or a farm; a transportation corridor; a natural feature, such as a grove of trees or a rock outcropping; a site on which an important structure once stood or an important event occurred; or a site containing important archaeological artifacts. A structure or site may be a cultural resource because of its physical attributes or because of its connection with a person or event that is important to the history of the area. Some cultural resources reveal past ways of life that might otherwise be forgotten. Others serve as a reminder that some activities, such as wine-making and horse-racing, which occur in the East County today have a long and distinguished history in the area.

### **■ EXISTING CONDITIONS**

#### **Cultural History of the East County**

The original inhabitants of the area now known as Alameda County belonged to the Chochenyo-speaking tribes which are related to the "Costanoan" language family. The Costanoan Indians occupied an area stretching from below Monterey, through the coast ranges to the Delta, and over to the San Joaquin River. The term Costanoan is derived from the Spanish word *Costanos* meaning coast people. The Chochenyo-speakers had a complex culture, including cosmology, mythology, and extensive trading networks. They relied on seasonally available foods, which consisted of a wide variety of plant and animal life.

During the late 1700's a large portion of the East County was used for grazing cattle from Mission San Jose, located in what is now Fremont. After the Mexican Revolution and the closing of the missions, the land was divided into ranchos which were granted through petitions to the Mexican government. The East County was divided among five ranchos: Rancho San Ramon, Rancho Santa Rita, Rancho El Valle de San Jose, Rancho Las Positas, and Rancho Canada de los Vaqueros (which was mostly in what is now Contra Costa County).

The urban communities that exist today were first settled in the mid-1800's and were characterized by limited growth based on a local agricultural economy that was effectively isolated from the urban centers of the Bay Area until the 1920's. Livermore and Pleasanton, located on railroad lines that were extended through the valley during the 1860's and 1870's, were primarily farm centers, serving livestock ranching and grain farming initially, and later, more intensive agriculture including viticulture and fruit and nut orchards.

After 1920, the automobile and an improved road system helped to integrate the East County with the Bay region, stimulating population growth and an expanded, more diversified local economy. During World War II, the location of two major military bases here resulted in substantial population growth.

In the 1950's, the East County's economy became dominated by nuclear research at the facility now called Lawrence Livermore Laboratory, Sandia Laboratories, and General Electric Vallecitos Nuclear Center. By the mid 1960's these three facilities accounted for more than half of all jobs in the planning area.

The 1950's and 1960's also saw the beginnings of substantial suburban residential development as road access to Bay Area employment centers was enhanced. Interstate Route 580 was improved to expressway standards in 1955. Interstate Highway 680 was completed from Walnut Creek to Dublin in the late 1960's and from Dublin to San Jose in the early 1970's.

Residential growth was rapid through the 1960's and early 1970's, but declined during the latter half of the 1970's due to tightened financing, high interest rates, inflation, shortfalls in public services, and public resistance to rapid growth. Many of these constraints eased in the early 1980's, bringing renewed residential growth.

During the 1960's and 1970's, local employment growth was concentrated in retail and service sectors and local government serving the resident population. In the 1980's, however, the East County's economic base expanded beyond research and resident services, as significant job opportunities in such areas as financial services and technology-related industries were provided. Most of these jobs are located in the many business parks that were constructed in the area, most notably Hacienda Business Park in Pleasanton which employs thousands of workers.

### **Historical Resources**

Several sites and buildings in the East County have received one or more of three historical designations. The National Register of Historic Places is administered by the National Park Service under the Secretary of the Interior. Locations on the list may include districts, sites, buildings, structures and objects that are significant in American history, architecture, archeology, engineering and culture. State Historical Landmarks are recommended to the State Department of Parks and Recreation by the State Historical Resources Commission, a seven member committee appointed by the Governor. Points of Historical Interest are locations of local significance that do not qualify for State Historical Landmarks registration. The Points of Historical Interest are transmitted to the State Historical Resources Commission by the Board of Supervisors with its endorsement.

The State has designated seven Points of Historical Interest and four State Historical Landmarks in the East County. Four sites have been listed on the National Register of Historical Places. These sites are listed in Table E-13 below and are shown in Figure 46.



TABLE E-13

**Historical Resources in the East County**

<b>National Register of Historical Places</b>		
<b>Date of Designation</b>	<b>Site</b>	<b>Location</b>
10/29/91	Heritage House	Alameda County Fairgrounds, Pleas.
6/26/79	Ravenswood	South of Livermore on Arroyo Road
4/6/78	Murphy D. J. House	291 McLeod Street, Livermore
11/16/78	Bank of Italy	2250 1st Street, Livermore
<b>California Historical Landmarks</b>		
<b>Site</b>		<b>Location</b>
Concannon Vineyard		2 Miles Southeast of Pleasanton Valley on Livermore Avenue
Cresta Blanca Winery		Arroyo Road Across From Veterans Hospital, South of Livermore
Francisco Solano Alviso Adobe		Meadowlark Dairy Farm, Pleasanton Valley
Livermore Memorial Monument		Livermore Avenue and Portola, Livermore
<b>Points of Historical Interest</b>		
<b>Date of Designation</b>	<b>Name of Point</b>	<b>Location of Point</b>
5/18/83	Wente Brothers Winery	5565 Tesla Road, Livermore
12/7/79	Green Store	Donlon Way & Dublin Blvd., Dublin
2/27/76	English-Mohr House	End of Mohr Ave., Pleasanton
12/22/75	Original Murray Schoolhouse	Old Dublin Road, Dublin
8/7/75	Fallon House	Foothill Road, Pleasanton
3/20/75	"Ravenswood" Site	2647 Arroyo Road, Livermore
7/17/67	Old St. Raymond Church	Donlon Way & Dublin Blvd., Dublin

## Archaeological Resources

*Archaeology in Alameda County: A Handbook for Planners*, a document prepared by Quaternary Research Group for Alameda County in 1976, identifies areas in the County that are of extreme, high, moderate, or minimal archaeological sensitivity. Areas of extreme sensitivity are scattered throughout the East County, with large concentrations along the I-680 corridor in the Pleasanton and Sunol areas. Areas of high or moderate sensitivity cover much of the remaining portions of the planning area. Very few areas are identified as being of minimal sensitivity. Figure 47 illustrates these areas.

Information on archaeological sites in the East County comes mainly from excavations conducted at several sites in the mid- and late-1970's. These sites indicate the presence of a previously unknown culture group which inhabited the edges of the seasonal marsh known historically to have covered a large portion of northern and western Pleasanton during a period sometime between 300 B.C. and 300 A.D. Analysis of burial artifacts indicate a rich culture linked to a major trade network, extending as far away as the eastern slope of the Sierras.

One of the most notable archaeological sites in the East County is the site of the Walker Caves, located in the North Livermore Valley. These caves contain rare prehistoric polychrome pictographs. Also in the area are rock shelters, lithic scatters, and middens consisting of a variety of artifacts.

## ■ PLANNING ISSUES

Preserving the East County's historical and cultural resources can enrich the lives of the East County residents by maintaining a link with the area's past and providing an opportunity to learn about those who lived there before. Preservation does not preclude development, but new development must be sensitive to the location and aesthetics of the resources that are being preserved to enhance rather than diminish their importance.

## ■ POLICY IMPLICATIONS

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Identification and preservation of archaeological and historical resources (including structures, sites and unique features) that are important to the heritage of the East County*
- *Establishment of design standards for new development that are sensitive to the location and appearance of cultural and historical resources*

## **SOURCES**

Alameda County Board of Supervisors, General Plan for the Livermore-Amador Valley Planning Unit, December 12, 1989.

Alameda County Planning Department, "Public Facilities and Services Background Report," Alameda County General Plan Review for the Livermore-Amador Valley Planning Unit", February 7, 1986.

Contra Costa County Water District, Los Vaqueros Draft Environmental Impact Report - Vasco Road and Utility Relocation Project, February 1990.

Quaternary Research Group, Archaeology in Alameda County: A Handbook for Planners, October 1976.





## Visual Resources

### ■ INTRODUCTION

The landscape of the East County is an assemblage of topographical, botanical, hydrological and man-made features. The planning area's visual character is defined by a mosaic of land uses (agriculture, wildlife, urban, etc.) and vegetative patterns (open range, stands of trees, row crops, etc.). Visual appearance varies seasonally and depends upon an ever-changing combination of seasonal color and texture, as well as upon the viewer's vantage point.

### ■ EXISTING CONDITIONS

The visual impression of the East County is that of an expansive flat valley floor contained by rolling hills rising to ridgelines. The valley is edged with moderately steep rolling hills covered with annual grasslands, oak woodlands and mixed chaparral. To the north, Mount Diablo in Contra Costa County stands out as a dominant but distant background feature on clear days. Pleasanton Ridge and Main Ridge are dominant landforms defining the western edge of the Livermore-Amador Valley. Heavily wooded, these ridges are relatively steep and predominantly undeveloped. Along the southern edge of the planning area, steep, east-facing slopes of north-south trending ridges are heavily wooded. To the east, the hills of the Altamont Range are moderately sloped, covered with annual grasses and studded with oaks along drainages.

The appearance of the East County's natural features changes with the seasons. In spring, grassy hills throughout the planning area are green and dotted with wildflowers. In early summer, green slopes turn gold and brown. Dark green oaks stand out against golden grass-covered hills. Winter rains return the hills to bright green.

With the exception of the vineyards in the South Livermore Valley and some row crops and irrigated pasture in the Mountain House subarea, there is little irrigated agriculture in the planning area. Approximately 200,000 acres of the Valley's grasslands are dedicated to range pasture, while just over 11,000 acres are dry-farmed. In summer, the coloration of these acres renders them indistinguishable from the annual grasslands prevalent in the planning area.

Development in the unincorporated East County consists predominantly of low-intensity uses such as scattered residences, and structures associated with farming. Exceptions include two residential enclaves at urban densities in Sunol/Kilkare and Castlewood; small-scale, locally-oriented retail commercial clusters in Sunol and Mountain House; highway-oriented uses in various locations; and wineries, restaurants, and sales facilities associated with viticulture.

Several prominent structural and industrial features punctuate the natural landscape of the East County. The sand and gravel quarries and associated aggregate plants in the Sunol, Quarry and South Livermore subareas are visually imposing. Wind turbines stand out against the hills and

skyline along the Altamont Range. Electric transmission lines traverse the landscape in various locations.

Two major interstate highways pass through the East County. I-580 runs east-west through the northern portion of East County, providing panoramic views of much of the planning area. I-680 runs generally north-south from the Contra Costa County border, through the Cities of Dublin and Pleasanton, and curves to the west, passing through the Vargas Plateau and into the City of Fremont. I-580 was determined to be eligible for official scenic highway designation and was included in *The Master Plan of State Highways Eligible for Official Scenic Highway Designation* by legislative act. In order to receive official designation as a state scenic route, the County must submit a resolution of intent to the state to initiate the designation process. After receiving the adopted resolution, Caltrans staff and the Departmental Transportation Advisory Committee (DTAC) reviews the proposed scenic route to determine if the route has reasonable potential for designation. Upon receiving DTAC's approval to proceed, the County prepares and adopts a program to protect and enhance the scenic corridor. If DTAC finds the protection program to be satisfactory, the Director of the Department of Transportation officially designates the route as a scenic highway. I-680 has gone through this process and is an officially designated State Scenic Highway. The County has adopted policies regarding the regulation of land use and density, detailed land and site planning, control of outdoor advertising, control of earthmoving and landscaping, and the design and appearance of structures and equipment within the scenic corridors of both I-580 and I-680 to protect the scenic quality of these routes (Alameda County Planning Commission, Resolution #77-85; Alameda County Board of Supervisors, Ordinance #77-27 and Resolution #174812).

### **Visual Characteristics of the Subareas**

West Dublin. The visual appearance of the West Dublin subarea is dominated by rugged, grass-covered ridgelines rising high above wooded canyons. Man-made features consist of a few widely scattered ranch-related structures. Several unique rock outcroppings add visual interest from vantage points within the subarea. High vantage points within the subarea provide views of the Tri-Valley to the north, east and south, and of Eden Canyon and the Palomares Hills residential development in Castro Valley to the west.

Much of the interior of the subarea is hidden from view from the rest of the planning area by tall ridgelines, which serve as a backdrop for views from many locations throughout the Tri-Valley. Donlan Point, adjacent to I-580, is a prominent visual feature which can be seen from a substantial distance in all directions. Eastern-facing slopes are visible from the City of Dublin and I-680.

East Dublin/Doolan Canyon. The visual character of the East Dublin/Doolan Canyon subarea is predominantly rolling hills of open rangeland. Two north-south trending ridgelines form Doolan Canyon itself, with a difference in relief from approximately 450 to 1,000 feet. Smaller finger ridges extend down from the larger ridgelines, creating the undulating topography present in the East County. To the south, a series of small ridges rise from the flat valley plain to visually screen the interior of the subarea from the I-580 corridor.



The dominant vegetation is annual grassland and some cultivated dryland crops. A relatively barren riparian area along Cottonwood Creek parallels Doolan Canyon Road. Ranches and rural residences are located along this road and are often surrounded by windrows of eucalyptus, cyprus or locust trees. Foreground views from Doolan Canyon Road take in the rural features: ranches, fence lines, farm equipment and cattle loading facilities. Long-range views to the north are limited to 0.5 - 0.75 mile due to the proximity of the adjacent 60 percent slopes. Vistas to the south from the southern edge of the subarea look across I-580 to the Livermore-Amador Valley and beyond.

Quarries. The large industrial equipment and structures associated with mining in the Quarries subarea are visible from any vantage point that affords a view of the Amador Valley floor, detracting from the aesthetic quality of the landscape. With implementation of the Chain-of-Lakes as described under the Specific Plan for Livermore-Amador Valley Quarry Area Reclamation, the visual resource of the subarea will greatly improve.

North Livermore Valley. The North Livermore Valley subarea encompasses the Las Positas Valley, which is approximately 3 miles wide and bounded by two ridgelines. To the west, two small north-south trending ridges form Collier Canyon and the western visual extent of the subarea. The northern end of the Altamont Hills forms the eastern skyline, and features views of Brushy Peak and rows of windmills along the hilltops. To the north, undulating grassy foothills intrude into the subarea from Contra Costa County, and Mount Diablo can be seen in the distance. A few small hilltops located within the I-580 Scenic Corridor obstruct views to the subarea from the highway.

As throughout the East County, the hillsides are covered with annual grasses. Specimen oaks dot the hillsides or group in the sheltered canyons visible to the north. Eucalyptus, cypress and locust windbreaks border some of the roads as well as the scattered residences.

North Livermore Avenue bisects the subarea. Virtually the entire subarea can be viewed from its straight north-south course, taking in all the natural and man-made features that contribute to this subarea's wide-open rural character. Similar views are obtained travelling along any of the rural roads on the subarea's interior. Leaving the subarea via North Livermore Avenue provides views of the Livermore-Amador Valley up to the ridgelines.

The flat valley floor supports dryland farming, grazing and scattered rural residences. The Livermore Monitoring Station of the Federal Communications Commission is located in the southeastern portion of the subarea. Three-story wooden poles, necessary for the station's operation, are dispersed throughout the approximately 115-acre site. Power lines cross the valley, and are visible against the backdrop of the Altamont Hills.

South Livermore Valley. The South Livermore Valley subarea is characterized by a mix of agriculture, rural residential development, and undisturbed areas. From the rural two-lane roads that thread along the subarea's shared boundary with the City of Livermore, scattered residences and lined drives, agricultural buildings and vineyards are visible in the foreground. To the north, views across the urban development within the City of Livermore stop at distant ridges within and beyond the boundaries of the East County, and include Mount Diablo.

Topography plays an important role in defining the character of this subarea. The flat valley floor gives way to rolling grass-covered hills to the south, east and west. The open expanses are punctuated by an occasional farm or group of trees (eucalyptus windbreaks or stands of oaks). Beyond the subarea boundaries to the south, west and east rise steep, dark tree and shrub covered ridges--including Rocky Ridge and Cedar Mountain--that visually contain the entire planning area. These ridgelines dominate the background views from nearly any vantage point in any direction from within the subarea.

A minor ridge system from the south penetrates the subarea, effectively dividing it into two viewsheds. The eastern viewshed includes Tesla Road, Crane Ridge, and the Arroyo Mocho while the western viewshed includes the Ruby Hill area, Sycamore Regional Park, and the Arroyo Del Valle. Lesser hills further divide the eastern and western viewsheds into thirds. Driving south on Greenville Road provides the best sweeping view of the subarea, excluding areas north of a small ridge parallel to Patterson Pass Road and the Alden Lane area, which is visually separated from the rest of the subarea by a heavily wooded arroyo.

Access along Greenville Road, while providing excellent long views of the subarea and beyond, is marked by foreground views of adjacent industrial areas, including the Lawrence Livermore Lab. Electrical utility towers, located on the tops of hills and along Mines Road, detract from views across the subarea to the south and east. A recreational vehicle storage facility located adjacent to Tesla Road in the midst of vineyards breaks up the pattern of agriculture in that viewshed. Views of the quarry area to the north and mineral extraction in Arroyo Del Valle can be seen from roads and hillsides in the western portion of the subarea.

Arroyo Mocho and Arroyo Del Valle support mature stands of sycamores. The riparian area along the Arroyo Mocho is visible in the foreground along Mines Road for a distance of approximately 2 miles. The sycamores and associated riparian plants of the Arroyo Mocho are protected in the Sycamore Regional Park and can be seen from adjacent roads.

Vineyards are an important visual feature that is unique to this subarea. The rows of vines accentuate the curves of the hills. Their deep colors contrast throughout most of the year with the golden-brown grasses in the background, and they can be seen from many points within and outside of the subarea.

Altamont Hills. This subarea is characterized by the complex of ridges and drainages that form the Altamont Range. Visually, the Altamont Range merges with the Mount Hamilton Range to the south and the Mount Diablo Range to the north to form the eastern "rim" of the Livermore-Amador Valley bowl, and the backdrop to many views from the valley floor. The overall topography is visually unchanging, featuring typical undulating grass-covered slopes rising to rounded peaks and ridgelines silhouetted against the sky. Brushy Peak, named for its evergreen shrub-covered summit, is the single natural feature that distinguishes itself from the rest of the Altamont Range, as the scrub vegetation persists in contrast to the surrounding grassland throughout the year.

Equally as significant in defining the character of this subarea are the wind turbines placed along the ridgetops of the Altamont Range. Located to take advantage of the high winds in this area,



hundreds of turbines can be seen from nearly all approaches to the subarea. They can also be seen silhouetted against the sky from many vantage points within the valley. Narrow graded access roads leading to wind turbines are visible as brown ribbons against the green hills during the winter and spring but virtually disappear when the hills turn gold and brown.

I-580, a designated scenic route, traverses this subarea passing through the valley and over Altamont Range through the Altamont Pass. As the principal east-west thoroughfare into and out of the valley, I-580 over the Altamont Pass serves as a gateway to the East County, providing a sweeping view of the entire valley. For travellers heading east, the hills provide a definite boundary between the San Joaquin and Livermore Valleys.

This subarea contains few residences. Located in sheltered areas for the most part, residences are not easily seen from the road. Two sanitary landfills are located off of Altamont Pass and Vasco Roads; fill areas are not generally visible from these roads, however the Vasco Road landfill can be faintly seen in the distance from vantage points in the south portion of the planning area. The railroad parallels Altamont Pass Road for a short distance. In general, these man-made features do not significantly contribute to the visual character of the subarea.

Mountain House. As the largest area of irrigated agriculture in the East County, the Mountain House subarea is visually very different from the rest of the planning area. Physically separated from the rest of the East County by the Altamont Range, Mountain House is more closely related geographically to the San Joaquin Valley. The foothills at the north end of the Altamont Range form the western boundary of the subarea and reach out into flat, lush green fields.

Houses, barns, and livestock are visible from the two main roads, Grant Line and Mountain House Roads, that provide access to this area. Irrigation ditches parallel the roadways. The small town of Mountain House at the junction of these two roads consists of a couple of commercial buildings, including a general store. The Tracy Pumping Station and the concrete aqueduct are in the foreground along Mountain House Road.

Because there is little topographic relief in the subarea, nearly all of the subarea can be viewed from the roads. The Altamont Range, usually covered with gold and brown annual grasses, serves as a backdrop for views to the west, which often feature Brushy Peak and Mount Diablo. To the east, the flat terrain affords long-range views across green fields well into San Joaquin County.

South Ridgeland. By far the largest of the subareas, the South Ridgeland comprises most of the southern portion of the planning area. The subarea's defining feature--repeating ridges covered with a mix of oak savannah, oak woodland, non-native grasses, bacharris brushland, and some pine forests--provides the backdrop for all southern views. This complex of northeast-southwest trending canyons and hills (which include Cedar Ridge, Rocky Ridge and Valpe Ridge) reach maximum heights of over 3,000 feet. Mount Rose located on Valpe Ridge rises to 3,817 feet, the highest elevation in Alameda County.

Land ownership in this subarea is approximately one-third public and two-thirds private. Included in the public lands are the holdings of the San Francisco Water District (SFWD) which



controls approximately one-third of the watershed lands, including San Antonio Reservoir. East Bay Regional Parks District (EBRPD) controls 3 parks: Sunol Regional Wilderness, Lake Del Valle State Recreation Area, and Ohlone Regional Wilderness.

Access into the subarea is limited and, because of topography, views are generally limited to the foreground. An exception is Del Valle Road heading north which, as it crests the ridge, affords vistas across the planning area to Mount Diablo.

La Costa Valley, the location of the San Antonio Reservoir, is the flattest portion of the subarea and is visible from Vallecitos Road (Highway 84). A series of power lines are also prominent middle ground features.

South Pleasanton. The South Pleasanton subarea consists primarily of the rolling grass-covered hills typical of much of the East County. The subarea is largely undeveloped, with the exception of low-density residential development adjacent to the City of Pleasanton. The General Electric Vallecitos Nuclear Center, located just north of Vallecitos Road, is the predominant man-made feature within the subarea.

Sunol Valley. Similar to other subareas, the Sunol Valley subarea is defined and developed according to the limitations imposed by topography. To the north, the tree-covered Pleasanton and Sunol Ridges define the western horizon of many views within the planning area. Precipitously steep for the most part, some residential development has occurred along the eastern flanks of the ridges. The community of Sunol, which includes a small commercial hub, is located at the junction of Foothill and Niles Canyon Roads. Rustic residential development lines Kilcare Road running northward from Sunol through the heavily-wooded Kilcare Canyon.

Niles Canyon Road winds along the bottom of Niles Canyon, curving along Alameda Creek at the base of the canyon walls, which rise almost 1,000 feet above the creek. Due to the curving of the road, views are mostly enclosed, although the face of the hills on both sides of the roadway is clearly visible. Hillsides with northern exposure are often densely vegetated, while south-facing hillsides are more often covered in annual grasses and dotted with California Live Oak trees.

Vegetation along much of the road is very thick. Riparian vegetation associated with Alameda Creek is visible from the roadway. Significant trees include mature California sycamores; a row of eucalyptus adjacent to Rancho Aguirre and an allee of trees between Sunol corner and I-680. Open fields and nursery crops at the eastern end of the road, near I-680, give an agricultural appearance to the view.

The Pacific Locomotive Association runs steam train rides along the Southern Pacific track that also winds along the canyon floor. A hillside quarry operation near the east end of the canyon is somewhat visible from Niles Canyon Road. In Sunol, the view from the road of the Water Temple (part of the City of San Francisco's Hetch Hetchy system) provides a unique visual landmark.

Alameda County, the City of Fremont and the City of Union City have been working to implement Assembly Bill 815 authored by Assemblywoman Delaine Eastin and approved by Governor Deukmejian in 1989 which designated Niles Canyon Road, between Mission Boulevard and Highway 680, as eligible for official designation as a State Scenic Highway. Caltrans has several procedures that must be followed in order to have the road formally designated as a scenic route.

South of I-680 are more ridges and canyons which lie primarily within San Francisco Water District (SWFD) or East Bay Regional Park District (EBRPD) lands. Calaveras Road runs north-south through the Sunol Valley and into the tree-covered hills overlooking the Calaveras Reservoir. There are several active sand and gravel quarries in the Sunol Valley area. Although the mining itself is not highly visible since it occurs below grade, processing plants and conveyors are visible from I-680 and Calaveras Road. Views of quarry activity from I-680 are partially screened by berms and boxed specimen trees housed at adjacent nurseries. Future expansion of these quarries could increase their visibility, particularly if new processing equipment or large conveyors are planned.

Adjacent to the City of Fremont, the Vargas Plateau and Sheridan Road areas stretch to either side of I-680. The combination of rolling hills and flat areas provides views of existing residential, commercial, agricultural and recreational development. To the south, Mission Peak, Monument Peak and Mount Allison (ranging in height from 2,517 feet to 2,658 feet) lie along the boundary between the East County and the City of Fremont.

West Pleasanton. The West Pleasanton subarea is predominantly natural in character, a distinction created by the relative absence of development, the complex of vegetation (mostly grassland and oak-bay woodland) and topography. Views from ridgetops within the subarea often include Mount Diablo, Mission Peak, the Livermore-Amador Valley, Mount Rose, and San Francisco Bay; sometimes Mount Tamalpais in Marin County can be seen across the Bay.

Sunol, Main and Pleasanton Ridges can be seen from many vantage points both within and outside of the East County. Main and Pleasanton Ridges form the western horizon for views from the east across the valley floor. The horizon is a relatively clean line, since most development has occurred along the lower slopes. However, a few man-made features such as Santos Ranch Road and some communication facilities stand out against the deep green vegetation and natural ridgeline. Rolling topography confines views from I-580.

Views of the West Pleasanton subarea from the west and the south are not experienced by as many viewers as are the views from the east and north. Sunol and Walpert Ridges, both largely undeveloped, separate the urban area along the Bay from the East County and block views from the west into the subarea. From the south, views into the subarea are generally not accessible from roads or residential areas, but users of Pleasanton Ridge Regional Park may view Sinbad Creek Valley, Pleasanton Ridge, and Sunol Ridge.



## ■ TRENDS

Historically, the East County has been predominantly rural in character, with a vast expanse of agricultural and undisturbed land surrounding the communities of Dublin, Livermore, and Pleasanton. In recent years these communities have changed from small agriculturally-oriented towns to fast-growing cities, containing a mix of residential, commercial, and industrial development. As urban development spreads across the Livermore-Amador Valley floor, it irreversibly changes the visual character of the area from rural to urban. Long-range vistas across the planning area reveal this expanding urban area. From the valley floor, the hillsides and ridgelines still appear relatively pristine. However, as development fills the valley, pressure to develop the hills and ridges increases.

Obviously, the visual appearance of agricultural land that is converted to urban uses is changed dramatically, but the presence of urban development also detracts from the rural character of other parcels in the vicinity as the urban edge is often visible across the agricultural lands.

## ■ PLANNING ISSUES

The East County has many visual features--prominent peaks and ridgelines, rolling hills, agricultural lands, picturesque canyons, arroyos, and reservoirs--that are integral to the visual character of the area. New development must be sensitive to these features in order to preserve this visual character.

Ridgelines provide a dramatic backdrop for many views from the valley floor and across the planning area. Alteration of a prominent ridge or development on it can dramatically affect views throughout a substantial portion of the planning area. Structures along the top of a ridgeline disrupt the smooth skyline created by the ridge. Heavily-wooded ridgelines may provide some vegetative screening as long as the development is below the ridgeline and the height of the structure or structures does not exceed the height of the tree canopy.

Grassy hills constitute the middle-ground views for much of the planning area. Because of their high visibility and relative lack of vegetation, any development on the hills or alteration of their shape significantly alters the visual quality of the area surrounding them.

Foreground views are key to establishing the visual character of an area. Any development visible from a public road will influence this visual character. Some development can affect both foreground and distant views. Development adjacent to public roads can detract from or entirely block distant views. Height, placement on the parcel, and general appearance (including design, type of surface, and color) are important considerations for development in visually sensitive areas. Another consideration is the appropriateness of the proposed use in the context of the surrounding land uses.

Views into and from parkland and public trails are an important component in the enjoyment of these facilities. The same factors considered to minimize negative impacts on views from public



roads should be applied to development in the vicinity of parks or other recreational open space uses to minimize visual impacts on these facilities.

Open space between East County communities is rapidly disappearing. Providing an open space buffer between cities helps preserve the individual identities of each community. Open space separating the cities also provides visual relief for both the residents of the cities and for those viewing the planning area as they travel through it.

### **Visual Considerations in Agricultural Areas**

On July 11, 1991, the Alameda County Board of Supervisors adopted site development review requirements for residences and industrial buildings in agricultural areas. Agricultural buildings are exempt to avoid County interference with agricultural activities. The primary purpose of the site review requirements is to minimize the visual and environmental impacts of the non-agricultural structures. The site review process involves consideration of many different factors such as ridgeline protection; design, color, and placement of the structure; visibility of the access road; grading; light and glare; and vegetation. To date, the County lacks established criteria for the site review process.

The Alameda County Zoning Ordinance allows a variety of non-agricultural uses, including outdoor recreation facilities that are not necessarily visually compatible with the surrounding agricultural uses. These uses are not necessarily conditional uses in Agricultural (A) Districts. No criteria now exist to help assess the visual compatibility of such uses with the agricultural environment.

### **Siting Facilities in Visually Sensitive Areas**

The locations of certain types of structures (such as water tanks, wind turbines, transmission towers, and microwave dishes) are determined by the structure's function and that function may necessitate siting in a visually sensitive area. The visual impact of these structures can be minimized through the use of a variety of techniques. However, attempting to hide the structure in an inappropriate way (e.g., behind a row of trees on an otherwise treeless hill) can actually make it more noticeable than it would be without any screening. Compatible color, surface texture, landscaping, and berming are all elements to be considered in obscuring visually incompatible structures. Utilities may be placed underground when possible, or located to minimize their visibility.

### **Landscaping**

Vegetation contributes significantly to an area's visual character. Preserving the existing vegetation as much as possible will help to minimize the visual impact of new development. The addition of landscaping to new development can enhance the appearance of the development or can be used to obscure negative visual elements. Landscaping that blends with the surrounding natural or historic vegetation is less intrusive visually than landscaping that is not compatible with existing vegetation. In selecting plants for screening, several sometimes conflicting factors need to be considered. Often, fast-growing plants are selected for screening

since they will obscure an undesirable view in a short period of time. Native vegetation tends to be slow-growing, but in the long-term will be more compatible with the surrounding area. Another consideration is the selection and placement of plants that will preserve distant views while obscuring immediate undesirable views. Selection of plant materials must also be considered in terms of fire hazards, biological resources, erosion control, and other issues in conjunction with visual considerations.

### **Grading**

Grading to accommodate new development can significantly change the appearance of an area by changing the natural contours of the land and eliminating the natural vegetation. Particularly noticeable is the grading of ridgelines, hilltops, and knolls, and the terracing of hillsides and large cut slopes which often cannot support vegetation. Grading that is sensitive to the visual characteristics of the area will complement or enhance the natural contours of the surrounding landscape and will preserve the existing vegetation as much as possible. Vegetation may also be added to screen or soften the effects of grading. Features such as drainage improvements on cut and fill slopes should be designed to be as invisible as possible. Grading for the access road to a proposed structure should be considered as well as grading of the site for the structure itself.

### **Windfarms**

Windfarm development has substantially altered the visual character of the Altamont Hills by introducing many prominent vertical elements to otherwise undeveloped rolling, grassy hills. Because the turbines are located along hilltops to optimize their efficiency, they are highly visible even at a considerable distance. Opinions regarding the appearance of the turbines are mixed. Some believe they add interest to the landscape, while others feel the industrial appearance of the structures is inappropriate in the natural landscape. Visually, the most prominent feature of the wind farm development is the wind turbine and tower assembly. Other visual elements include grading, access roads, buildings, substations, various power collection lines and meteorological data gathering towers. In general, visual appearance is improved when inoperable turbines are removed and replaced, and when similar turbine types are grouped together rather than having a variety of types mixed in one location (which can create an appearance of visual chaos). Wind farm development is regulated through the County's conditional use permit process.

## **■ POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Protection of visually sensitive ridgelines and hillsides*
- *Preservation of community separators*

- *Preservation of significant vegetation, including visually sensitive areas of natural vegetation, historically significant vegetation, windbreaks, or individual trees of notable size or age*
- *Preservation of both foreground and distant views from parkland and public trails*
- *Preservation of important viewsheds*
- *Review of conditional uses permitted by the Zoning Ordinance in the A District to eliminate those not compatible with agriculture*
- *Establishment of criteria for the site development review process for residences and non-agricultural buildings in agricultural areas*
- *Establishment of design guidelines for urban development that address both the appearance of the development and its effects on views*
- *Establishment of landscape guidelines for both urban and rural development*
- *Establishment of grading guidelines for both structures and access roads*



## SOURCES

Alameda County Planning Department, Draft Environmental Impact Report, South Livermore Valley Area Plan, June 1992.

City of Dublin, West Dublin General Plan Amendment Specific Plan Study, Study Report 1: Environmental Setting/Planning Considerations, November 27, 1989.

City of Livermore, Draft Environmental Impact Report, North Livermore General Plan Amendment, January 30, 1992.

City of Pleasanton, West Pleasanton Expanded Planning Area Study: Opportunities and Constraints Analysis and Basis for Planning, June 1989.

State of California, Department of Transportation, Scenic Highway Report - Route 680 in Alameda County between the Santa Clara and the Contra Costa County Lines, October 1974.

State of California, Department of Transportation, Guidelines for the Official Designation of Scenic Highways, November 1990.

## Energy

### ■ INTRODUCTION

Major energy sources for the East County include electricity, wind, and oil and natural gas. The County currently does not have hydroelectric, major solar, geothermal, or nuclear power production facilities within its boundaries.

### ■ EXISTING CONDITIONS

#### Overview of the East County's Major Sources of Energy

Electricity. Electricity is provided to Alameda County by PG&E, Western and NCPA. The Alameda Bureau of Electricity receives 38 percent of its electric generating capacity from NCPA's geothermal plants in the Geysers Resource Area in Lake County, 24 percent from NCPA's hydroelectric project in Calaveras County, 18 percent from NCPA's combustion turbine plants in the city of Alameda, Placer County, Roseville and Tracy, and 20 percent from power purchased from Western.

The East County planning area is traversed by several 69-, 115-, 230-, and 500 kV electric transmission lines. These lines are owned and operated by PG&E and Western. The only Western line is a 230-kV transmission line that runs from the Tracy substation to Lawrence Livermore Lab. All lines in the East County planning area are above-ground.

Two of the County's three major substations, Tracy and Tesla, are located in the East County planning area. These substations are the distribution points for various lines and voltages. The Tracy substation has three 230-kV transmission lines; the Tesla substation has nine 230-kV lines, two 115-kV lines and a 500-kV line. The East County also contains eleven of the County's twelve 69-kV substations. Except for the Livermore Lab 115-kV substation, all of the County's 115-kV substations are in the western portion of the County. Refer to Figure 26 for approximate locations of major electrical facilities. For further discussion, see the *Major Public Facilities and Utilities* background report in Section D.

Wind. There are extensive wind turbine fields in the area north and south of the Altamont Pass near the boundary with San Joaquin County. The Altamont Pass Wind Resource Area straddles both Alameda and Contra Costa Counties. It is the most developed wind resource area in the world with approximately 7,000 wind turbines (of which over 5,800 are within Alameda County), producing 1,100 million kilowatt hours of electricity annually for distribution by PG&E.

There are 103 wind developments approved in Alameda County, of which 75 developments are currently operating. Operators include U.S. Windpower, Fayette, FloWind, LFC, Seawest, and

Altamont Americal Partners. Refer to Figure 7 for the location of the wind resource area in the East County. For additional information, see the *Non-Urban Land Use and Open Space* background report in Section A.

Natural Gas, Oil and Product Pipelines. Both of Alameda County's two major petroleum and gas fields are in the East County area: Hospital Nose Gas Field (abandoned) several miles south of the city of Livermore, and Livermore Field, 3 miles east of Livermore. There are also various individual wells scattered throughout the planning area. Currently, there are 74 plugged and abandoned dry hole wells, 6 plugged and abandoned oil wells, 1 plugged and abandoned gas well, and 8 complete oil wells. The total petroleum production for 1990 was 19,053 barrels. There was no natural gas production in the County in 1990.

Pipelines traversing the East County area include natural gas pipelines, oil pipelines and produce pipelines. Santa Fe Pacific Pipe Line Partners (S.F.P.P.) has a pipeline that extends north to south from the Contra Costa County line through Pleasanton and down to Santa Clara County. S.F.P.P. has another pipeline that extends from the Tracy area southwest across the East County to Santa Clara County. Chevron Pipeline Company also contains a product pipeline following the same general route. PG&E has several natural gas pipelines traversing the East County. In addition, five oil pipelines traverse the northeastern corner of the planning area. Refer to Figure 27 for the approximate locations of major pipelines. For additional information see the *Major Public Facilities and Utilities* background report in Section D.

Solid Waste. The East County planning area contains one solid waste-to-energy facility located in Pleasanton and one landfill gas facility located at the Altamont Landfill. The waste-to-energy facility is operated by the Dublin San Ramon Service District. It produces .38 MW of electricity. The landfill gas facility has a capacity of 13.2 MW. It uses landfill gas as a source of fuel to produce electricity for PG&E.

## **Proposed Facilities**

Energy facilities under consideration in the East County include a cogeneration plant and a 500-kV transmission line. The cogeneration plant would consist of a natural gas cogeneration facility at Lawrence Berkeley Labs with an estimated size of 400 kW. The California-Oregon Transmission Project (COTP) is a 500-kV transmission line currently being constructed from southern Oregon to the Tracy Substation. It will then extend to the Tesla substation where PG&E will distribute power to customers in Alameda County. Lawrence Livermore Lab also has a contract with Western to receive COTP power directly from the Tracy Substation through its 230-kV transmission line. Western anticipates that the transmission line will be fully energized by sometime in 1993.

## **Energy Demand -- Existing Annual Energy Use by Market Sector in Alameda County**

The collection of available energy consumption data does not necessarily follow strict geographical (county) boundaries. For example, PG&E's service area covers northern and central California. Energy is provided on a grid network according to need. Therefore, energy usage data compiled for Alameda County's Energy Element is based upon statewide consumption



patterns from data from the California Energy Commission and energy usage data at the operating division level from Pacific Gas and Electric Company (see Table E-14 below).

<b>TABLE E-14</b> <b>Electrical and Natural Gas Consumption</b> <b>For Market Sectors in Alameda County - 1991</b>		
<b>Market Sector</b>	<b>Electricity Gigawatt (GWH)</b>	<b>Gas (Million Therms)</b>
<b>Residential</b>	2,632.5 (29.8%)	280.5 (54.0%)
<b>Commercial</b>	502.0 (39.7%)	107.3 (20.6%)
<b>Industrial</b>	2,459.4 (27.9%)	126.4 (24.3%)
<b>Agricultural</b>	7.3 (0.1%)	3.3 (0.6%)
<b>Other</b>	228.0 (2.6%)	2.4 (0.5%)
<b>Total</b>	<b>8,829.2 (100%)</b>	<b>519.8 (100%)</b>
<b>Source:</b> PG&E, PowerSaving Partners RFP, 1992; California Energy Commission		

## Energy Conservation

There are no specific energy conservation codes for Alameda County, however, the County follows the provisions set forth by Title 24 of the California Code of Regulations, Energy Conservation Standards.

## ■ TRENDS

### Increased Energy Consumption

Major population and employment growth is planned and projected for the East County. While energy conservation has the potential to extend existing resources, a near doubling of the East County's population by 2010 will require substantial expansion of existing energy facilities and possibly identification of new energy sources.

## ■ PLANNING ISSUES

### Siting of Energy Facilities

The development and placement of local electrical distribution lines, major transmission lines and substations are currently exempt from regulation in local city zoning ordinances. However,

buildings for utility company offices, service yards and storage yards are required to comply with land use regulations. Offices and business uses by utility companies are allowed in commercial and industrial districts.

Right-of-Way (ROW) widths for transmission lines vary depending on several factors including terrain, land use, and conductor size. Typical minimum ROW widths for various types of transmission lines are listed below:

- o 500-kV line: 150 to 200 feet
- o 230-kV line: 100 feet
- o 115-kV line: 75 feet
- o 69-kV line: 40-75 feet

These right-of-way widths may be subject to change as more information becomes available about the potential health impacts of electromagnetic fields.

The Scenic Route Element of the County General Plan (adopted 1966) recommends that transmission lines be placed underground near scenic routes or in inconspicuous locations. Utility company buildings and yards are assumed to be the same as any other business and receive no special attention in these plan elements and policies.

Land requirements per pole or tower range from as little as one square foot for a 69-kV line to 1,444 square feet for a 500-kV line.

Safety and nuisance considerations for the siting of transmission lines include: aviation hazards, electromagnetic field effects, interference with communication systems, fire hazards, audible noise, hazardous shocks and nuisance shocks. New electric transmission right-of-way distances need to be developed on an interim basis to ensure protection of public health until more definitive information on the effects of electromagnetic fields is available. See the *Electromagnetic Fields* background report in Section F.

## **Energy Conservation**

The goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include: decreasing overall per capital energy consumption; decreasing reliance on natural gas and oil, and; increasing reliance on renewable energy sources.

PG&E studies on the potential for conservation indicate that the greatest potential for electric energy savings exists in the commercial sector (16.3 percent of total sector consumption) followed by the residential sector (10.4 percent), and the industrial market sector (2.9 percent). Estimated natural gas savings potential ranged from 13.5 percent in the industrial market sector to 3.7 percent in the commercial sector. Estimated savings in the transportation sector ranged from 5.95 trillion British thermal units (BTU) in 1987 to 7.55 trillion BTUs in 2009, or the equivalent amount of electricity to power all the homes in Alameda for 4.3 months out of the year (CEC, 1992).

The County should consider adopting additional, cost-effective and energy-efficient building standards that exceed those of Title 24. Suggested policies relate to the development of stricter building standards, a technical assistance program for aiding developers in selecting conservation energy measures, implementation of energy efficiency evaluations for any proposed large-scale development, development of incentives for ultra-efficient projects, and the monitoring of results in efficiency (CEC, 1992). Maximizing wind resources and solid waste-to-energy facilities could also significantly contribute to energy conservation in the County.

### ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- o Development of electric transmission right-of-way guidelines to ensure protection of public health.*
- o Adoption of additional cost-effective and energy-efficient building standards that exceed those of Title 24.*
- o Maximization of wind resources and solid waste-to-energy facilities.*



## SOURCES

California Energy Commission, Energy efficiency and Conservation Report of the Energy Element for Alameda County, November 1992.

Ebasco Environmental, Draft Final Report: Environmental Setting of the Energy Element for Alameda County, June 1992.

Ebasco Environmental, Draft Final Report: Energy Facility Siting Report of the Energy Element for Alameda County, June 1992.

# Soil Associations

## LEGEND

### Soils of the Uplands

- 1** Altamont - Diablo
- 2** Vallecitos - Parrish
- 3** Millsholm - Los Gatos - Los Osos

### Soils of the Terraces, Alluvial Fans, and Floodplains

- 4** Yolo - Pleasanton
- 5** Positas - Perkins
- 6** Clear Lake - Sunnyvale
- 7** Rincon - San Ysidro



SOURCE: Soil Survey, U.S. Department of Agriculture, Soil Conservation Service, Jan. 1965

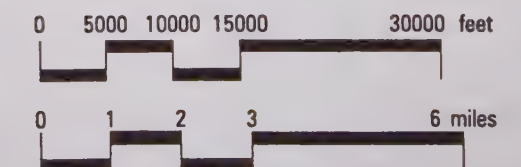





FIG. 30



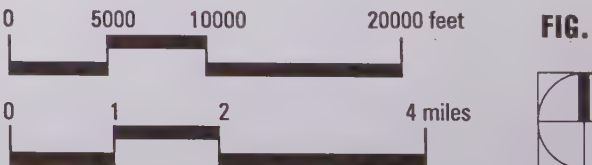


# Construction Aggregate Resource Areas

- LEGEND
-  Sector Boundary
  -  Properties Owned or Controlled by Aggregate Producers
  -  Depleted Resources






SOURCE: Regionally Significant Construction Aggregate Resource Areas in the South San Francisco Bay Production - Consumption Region, State Mining and Geology Board, Jan. 1987

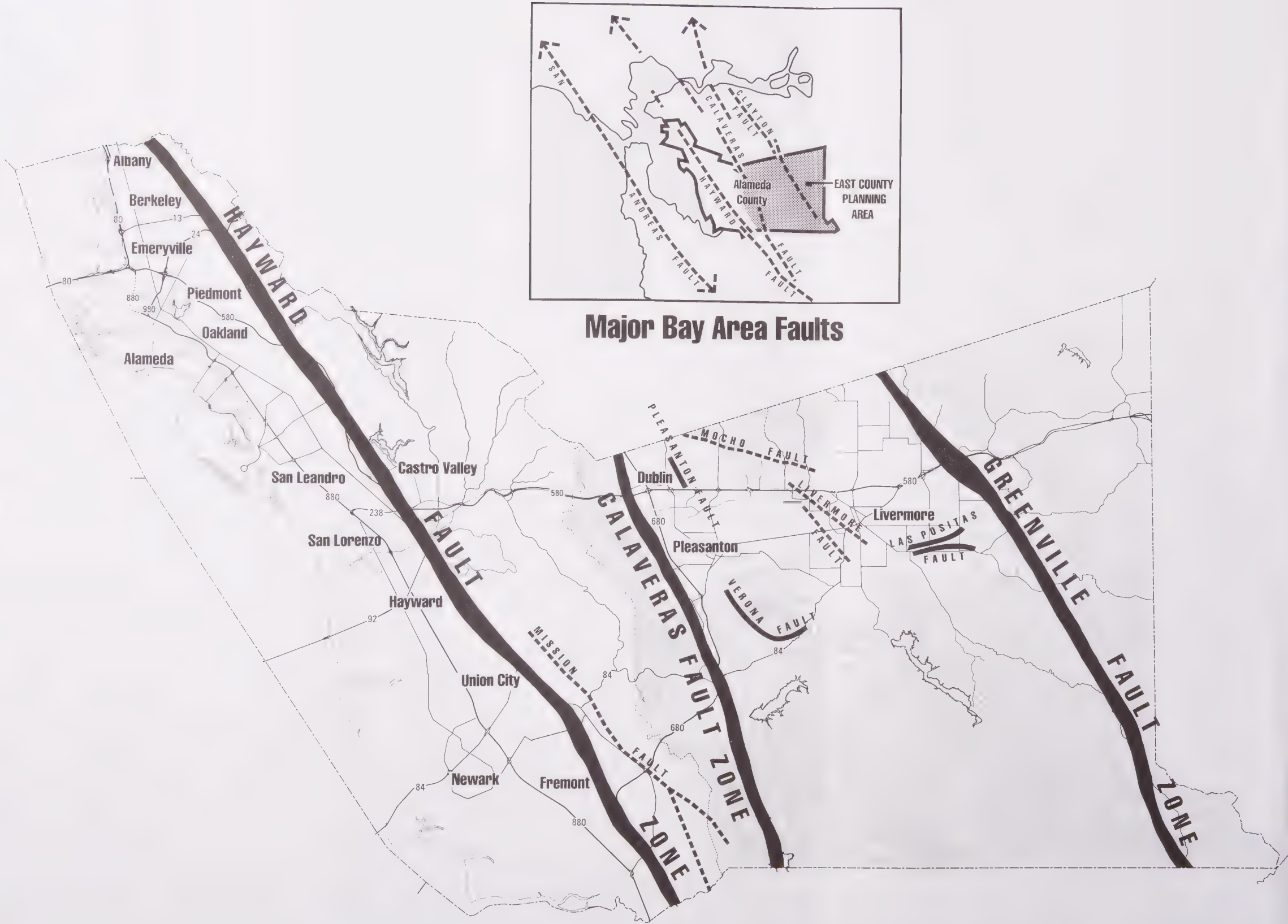




# Faults in Alameda County

## LEGEND

-  Active Fault Zone (a belt of intermittent fault traces)
-  Active Fault
-  Potentially Active or Activity Uncertain



SOURCE: California Division of Mines and Geology, 1981

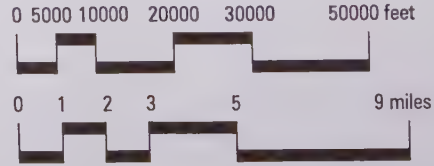


FIG. 32







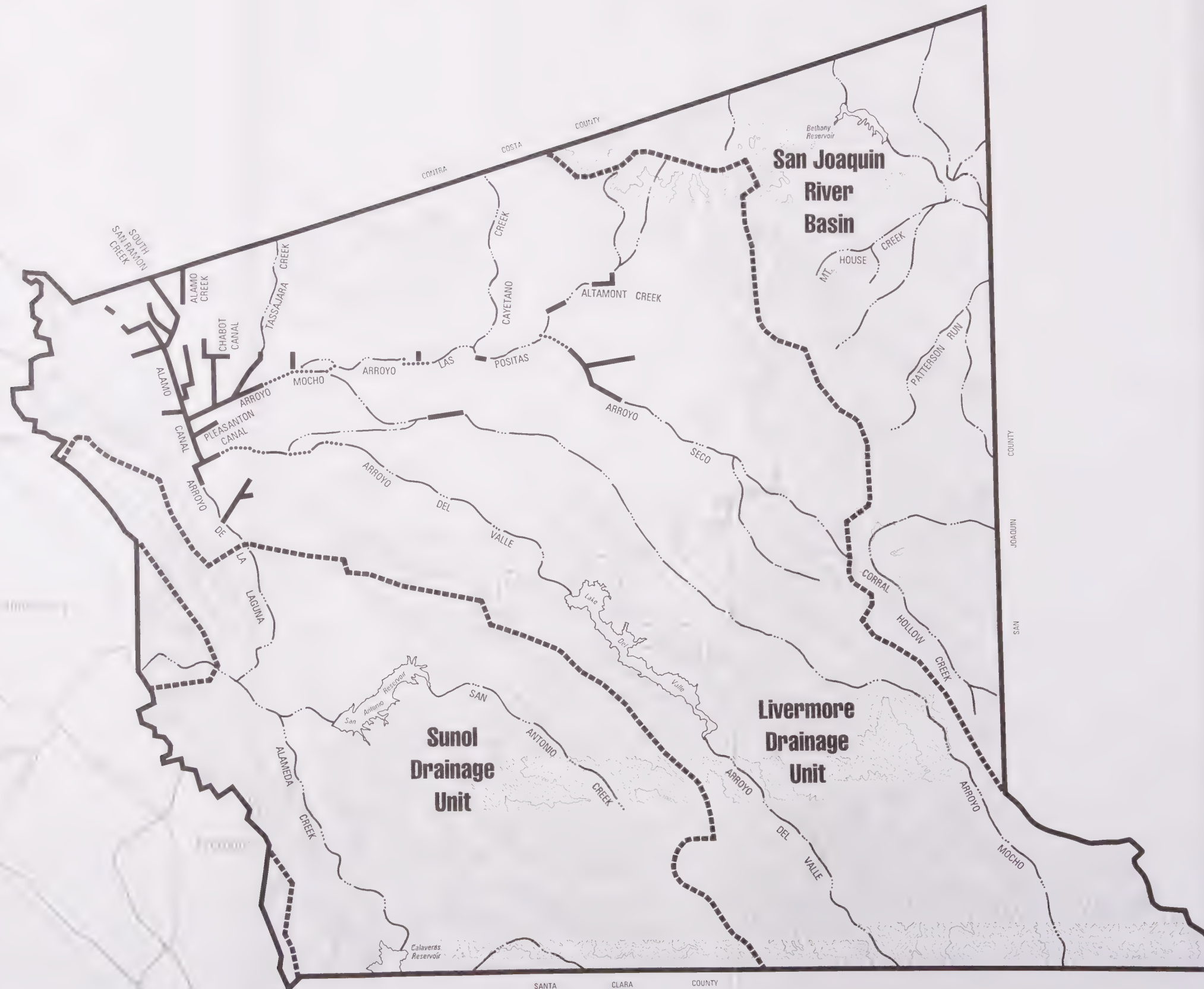




# Surface Water Hydrology: Existing Conditions

## LEGEND

-  Fully Improved Channel
-  Partially Improved Channel
-  Channel not Maintained by Zone 7
-  Drainage Unit Boundary



SOURCE: Zone 7 Owned & Maintained Facilities ACFCWCD  
Bulletin No. 118-2, Livermore and Sunol Valleys, Evaluation of  
Ground Water Resources, State of California Department of  
Water Resources, August 1966 and June 1974

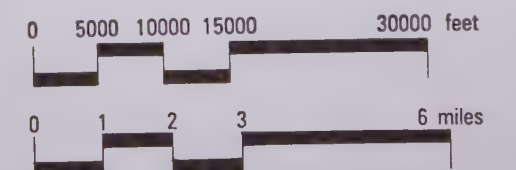


FIG. 33







Rainfall Isohyets

LEGEND

14 Mean Annual Precipitation in Inches (1888-1977)



SOURCE: Mean Annual Precipitation and Unit Frequency Duration Curves, ACFCWCD, 1981

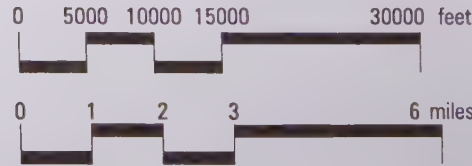







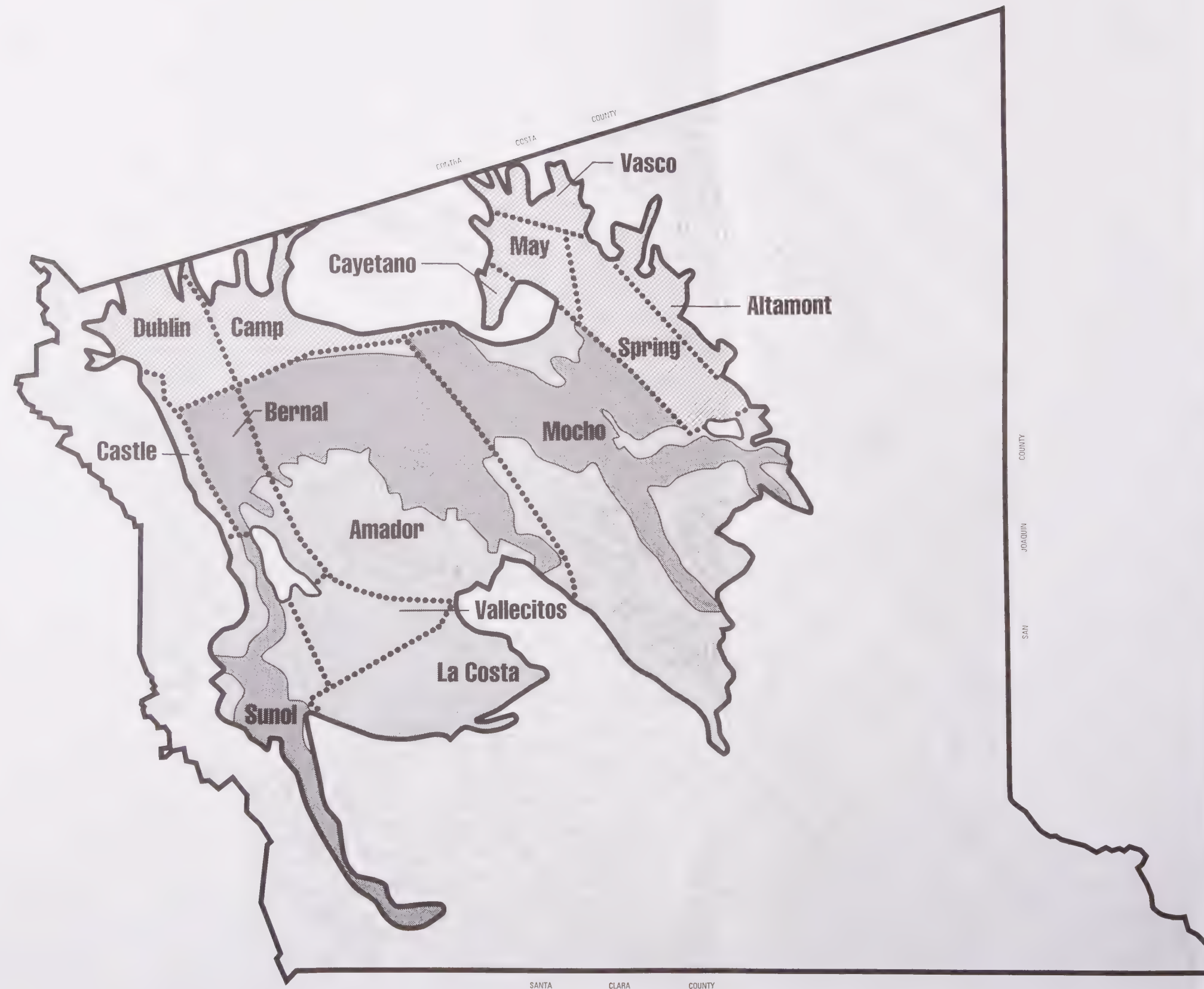
FIG. 34



# Groundwater Basins

## LEGEND

-  Groundwater Basin Boundary
-  Subbasin Boundary
-  Central Groundwater Basin
-  Fringe Groundwater Subbasins
-  Uplands



SOURCE: *Bulletin No. 118-2*, California Department of Water Resources  
Aug. 1966 and June 1974

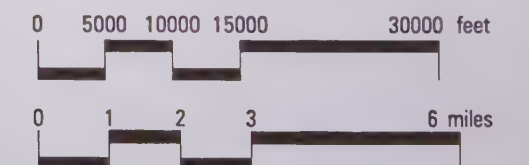


FIG. 35









# Groundwater Level Contours

## LEGEND

-  Recent Alluvium
-  Groundwater Level, 20 ft. Intervals



SOURCE: Fall 1991 Groundwater Contour Map, ACFCWCD Zone 7, 1992

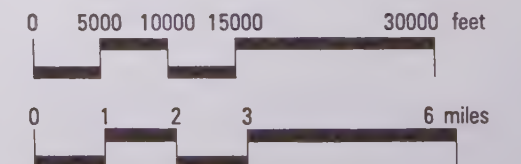


FIG. 36





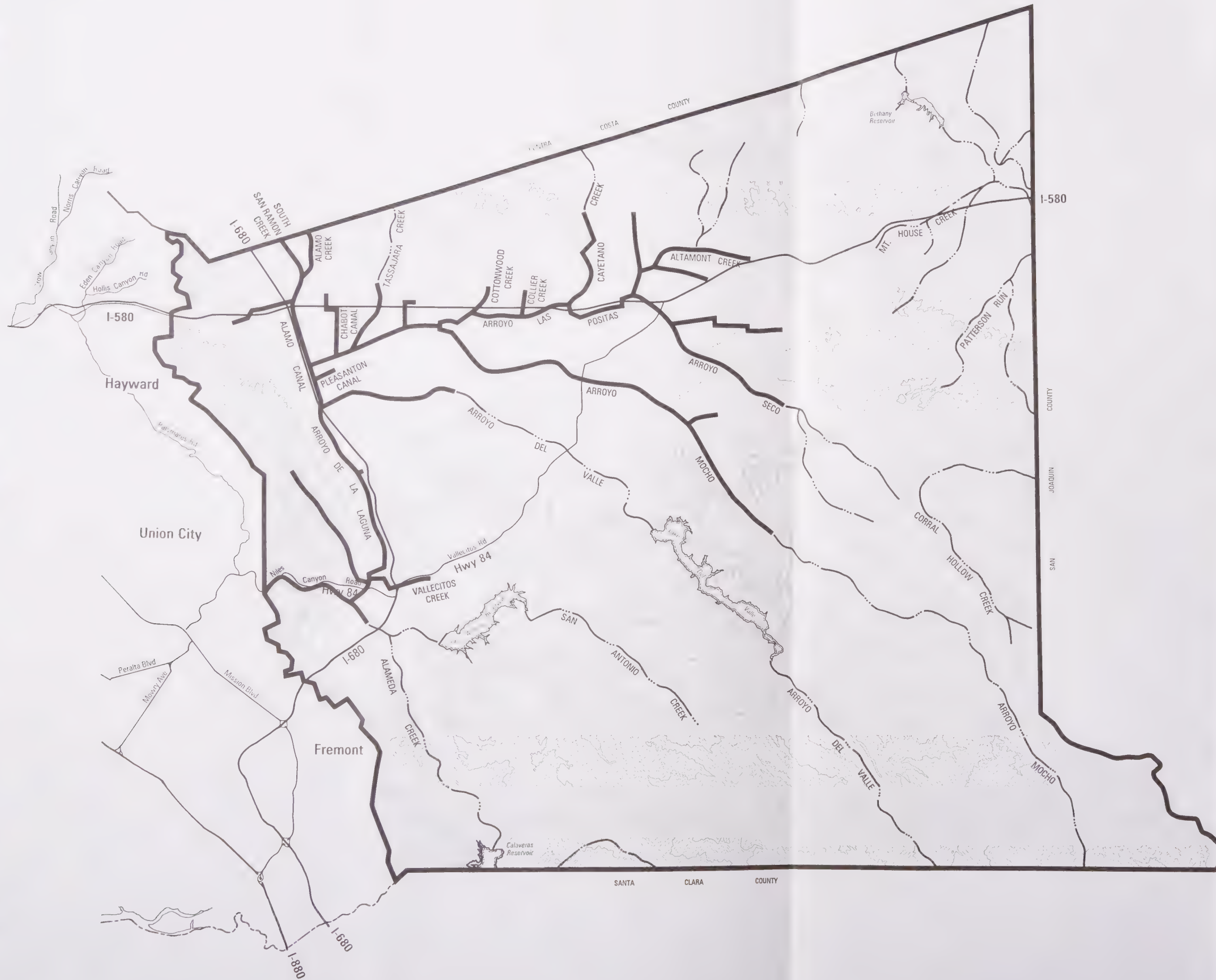




# Zone 7 Master Plan Elements

## LEGEND

-  Special Drainage Area (SDA) 7-1 Channel
-  Other Channels Maintained by Zone 7



SOURCE: Flood Control Base Map, Authorized Project Lines, ACFCWCD, 1988

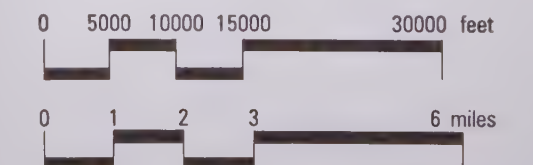


FIG. 37





### LEGEND

-  Highways & Major Roadways
-  Electrical Transmission Lines
-  Quarry/Mining Operations
-  Industrial Facilities
-  Airport
-  Rail/Rapid Transit Lines

**NOTE:** Fixed point noise sources are shown only in or near urbanized areas. They are represented schematically and are not to scale.

SOURCE: USGA 60 Min. Quad. Stockton, CA 1989

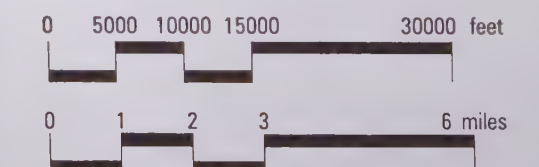


FIG. 39








# Noise Contours (1990): Roadways

## LEGEND

 Areas Exposed to a DNL of 60dB or greater

**NOTE:** Roadway noise levels were calculated using the Federal Highway Administration's Traffic Noise Prediction Model (FHWA-RD-77-108). In order to accurately reflect noise levels on California roads, California Vehicle Noise Emission Level curves were also incorporated into the model. Peak hour traffic volumes and average travel speeds were used to calculate the peak hour Leq, which was assumed to be equivalent to the day/night average sound level (DNL).



SOURCE: Charles M. Salter Associates, 1993.

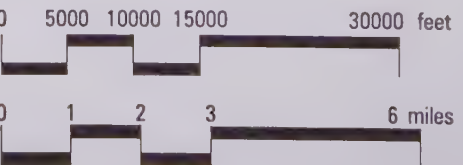


FIG. 40








# Noise Contours (2010): Roadways

## LEGEND

 Areas Exposed to a DNL of 60dB or greater

**NOTE:** Roadway noise levels were calculated using the Federal Highway Administration's Traffic Noise Prediction Model (FHWA-RD-77-108). In order to accurately reflect noise levels on California roads, California Vehicle Noise Emission Level curves were also incorporated into the model. Peak hour traffic volumes and average travel speeds were used to calculate the peak hour Leq, which was assumed to be equivalent to the day/night average sound level (DNL).



SOURCE: Charles M. Salter Associates, 1993.

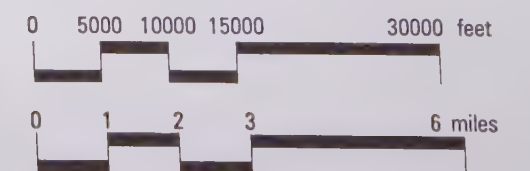






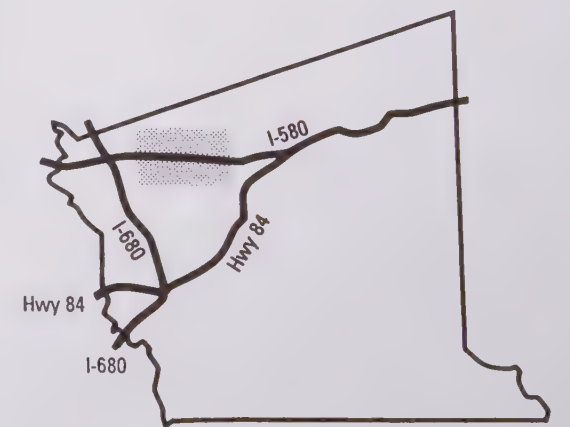
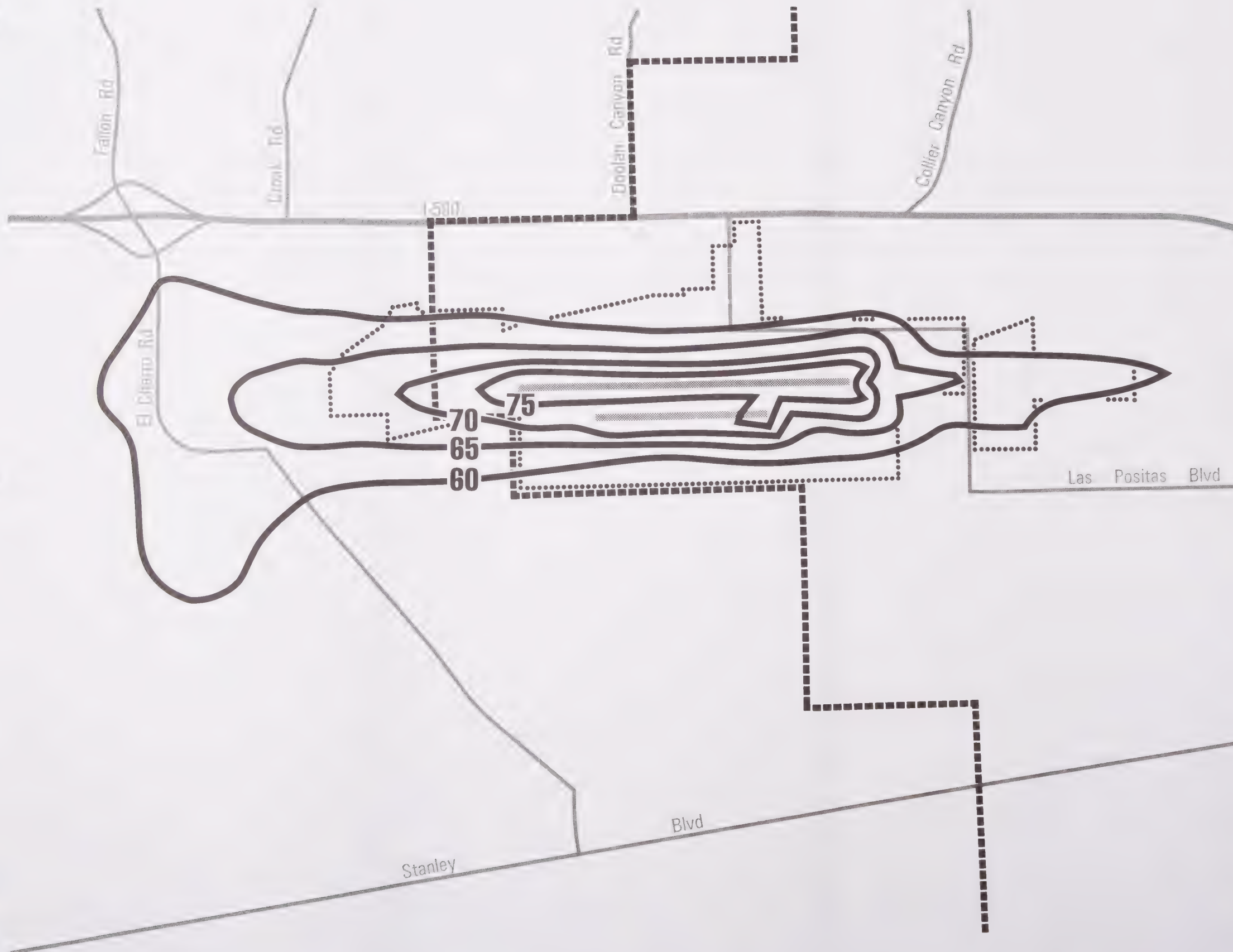
FIG. 41



# Noise Contours (1991): Livermore Municipal Airport

## LEGEND

-  CNEL Noise Contour
-  Runways
-  Livermore City Limit
-  Airport Property Line



SOURCE: McClintock, Becker & Associates, March 1992

FIG. 42

0 1000 2000 4000 feet







# Biological Resources: Data Sources

## LEGEND

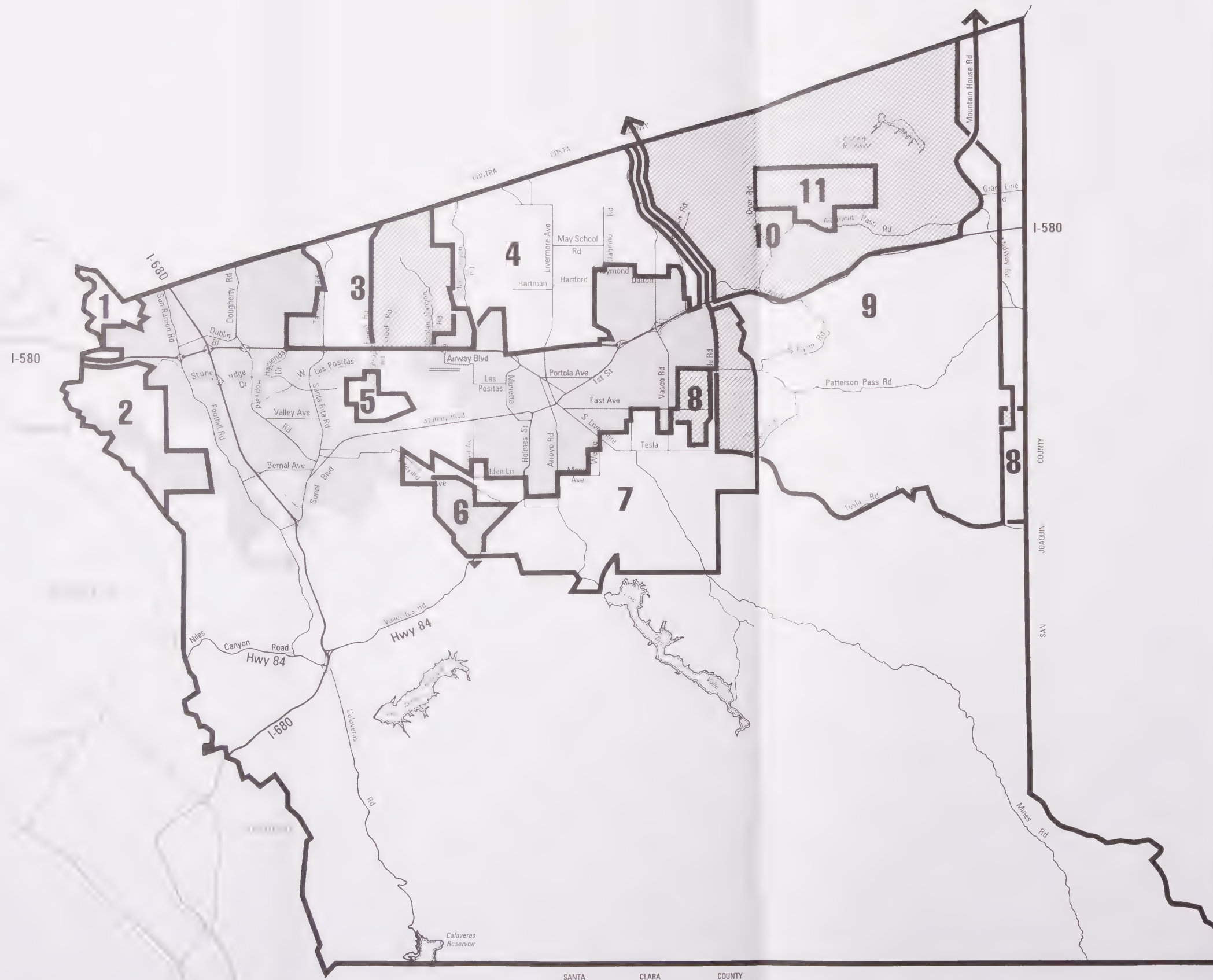
1. *Western Dublin Specific Plan/General Plan Amendment Draft EIR*, City of Dublin, December, 1991.
2. *West Pleasanton Sphere of Influence Study Draft EIR*, City of Pleasanton, April, 1990.
3. *Eastern Dublin General Amendment Plan and Specific Area Draft Plan Biological Assessment*, Wallace, Roberts & Todd, July, 1989.
4. *North Livermore General Plan Amendment Draft EIR*, City of Livermore, January, 1992.
5. *Kaiser Sand & Gravel Company Surface Mining Permit and Reclamation Plan Draft EIR*, Alameda County Planning Department, August, 1991.
6. *Ruby Hill Development GPA and 1837 Zoning Unit Draft EIR and Addendum*, Alameda County Planning Department, Nov., 1989 (EIR), May, 1990 (Addendum).
7. *South Livermore Valley Area Plan Draft EIR*, Alameda County Planning Department, June, 1992.
8. *Draft EIS/EIR for Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories*, U.S. Department of Energy and University of California, February, 1992.
9. *Altamont Hills Landfill Program Draft EIR*, Alameda County Planning Department, October, 1988.
10. *Vasco Road and Utility Relocation Project Draft EIR*, Contra Costa Water District, February, 1990.
11. *Altamont Sanitary Landfill Expansion Biological Resource Study and Preliminary Impact Assessment*, Bryan A. Stirrat Associates, September, 1992.

**NOTE:** Numbered areas correspond to data sources identified in the legend.  
Striped areas denote areas covered by more than one data source.

0 5000 10000 15000 30000 feet

0 1 2 3 6 miles









**FIG. 43**







### LEGEND

- |   |  |
|---|--|
|    | Grassland<br>Non-Native Grassland<br>Valley Needlegrass Grassland              |
|    | Woodland<br>Coast Live Oak Forest<br>Mixed Evergreen Forest<br>Riparian Forest |
|    | Scrub<br>Diablan Sage Scrub<br>Coastal Scrub                                   |
|   | Cultivated<br>Dry Land Agriculture<br>Row Crops<br>Vineyards                   |
|  | Alkali Sink<br>Valley Sink Scrub<br>Alkali Grassland<br>Alkali Meadow          |
|  | Mixed Conifers<br>Digger Pine Woodland<br>Monterey Pine Forest                 |
|  | Developed Areas/Reservoirs   |
|  | Streams  |

SOURCE: *Natural Cover Types, Basic Data for the Land Use Portion of the Master Plan, Alameda County, California, Alameda County Planning Department*

Element Occurences in Alameda County, California  
Department of Fish & Game, Natural Division,  
July, 1992

Assorted Environmental Documents prepared for the planning area from 1988 to 1992. See text for details.

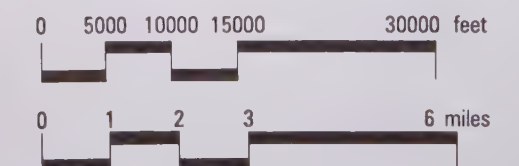


FIG. 44







# Special Status Species & Communities

## LEGEND

- Special Animals
  1. Alameda Whipsnake
  2. Burrowing Owl
  3. California Horned Lizard
  4. California Red-Legged Frog
  5. California Tiger Salamander
  6. Golden Eagle
  7. Hygrotus Diving Beetle
  8. Longhorn Fairy Shrimp
  9. San Joaquin Kit Fox
  10. San Joaquin Pocket Mouse
  11. Tricolored Blackbird
  12. Western Pond Turtle
- Special Plants
  1. Caper-Fruited Tropidocarpum
  2. Diablo Helianthella
  3. Diamond-Petaled California Poppy
  4. Ferris' Bird's Beak
  5. Hispid Bird's Beak
  6. Large-Flowered Fiddleneck
  7. Mt. Diablo Buckwheat
  8. Mt. Hamilton Thistle
  9. San Joaquin Saltbush
  10. Showy Indian Clover
  11. Stinkbells
  12. Talus Fritillary
- ▲ Natural Communities
  1. Northern Claypan Vernal Pool
  2. Sycamore Alluvial Woodland
  3. Valley Sink Scrub

SOURCE: California Department of Fish and Game, July, 1992.  
Assorted Environmental Documents prepared for  
the planning area from 1988 to 1992. See text for details.

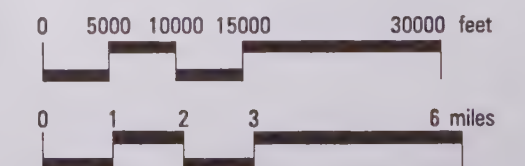
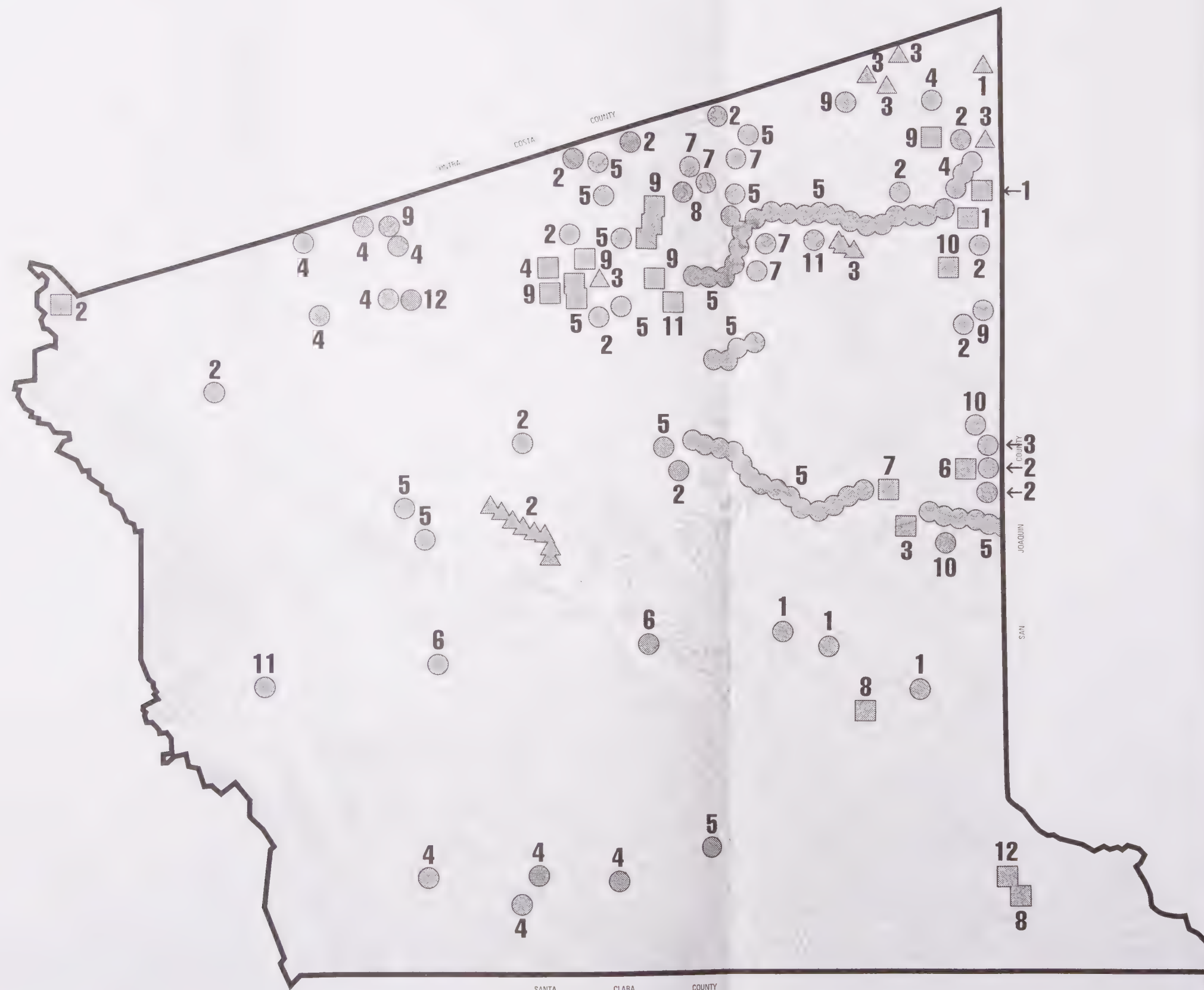


FIG. 45







# Historical Resources

## LEGEND

- National Register of Historical Places
  1. Heritage House
  2. Ravenswood
  3. Murphy D.J. House
  4. Bank of Italy
- California Historical Landmarks
  5. Concannon Vineyard
  6. Cresta Blanca Winery
  7. Francisco Solano Alviso Adobe
  8. Livermore Memorial Monument
- Points of Historical Interest
  9. Wente Brothers Winery
  10. Green Store
  11. English-Mohr House
  12. Original Murray Schoolhouse
  13. Fallon House
  14. Old St. Raymond Church

SOURCE: Alameda County Planning Department

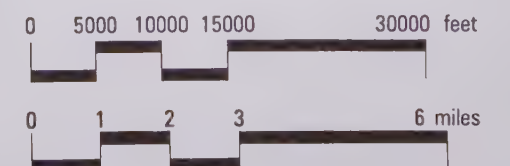


FIG. 46







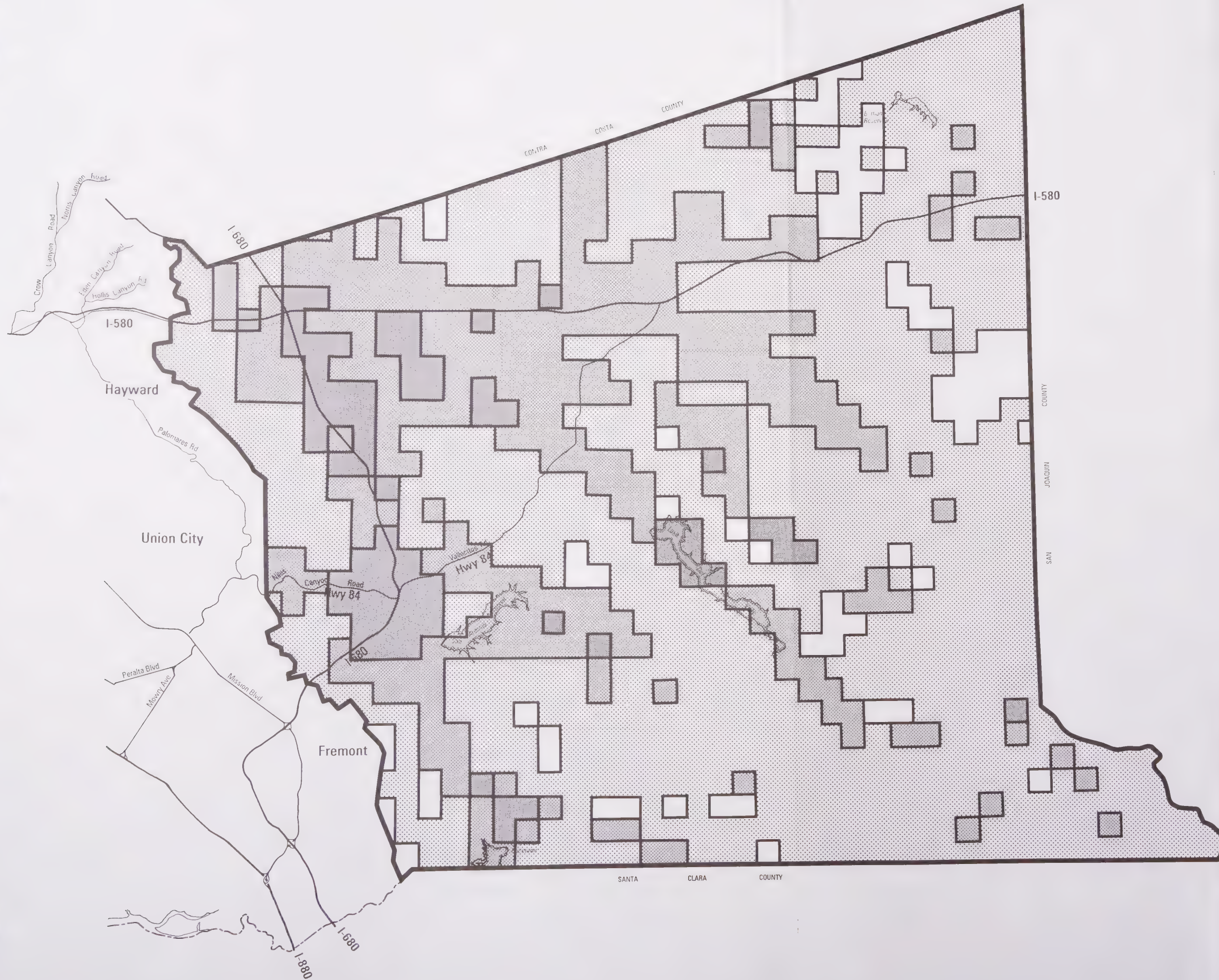




# Archaeological Sensitivity

## LEGEND

-  Extreme
-  High
-  Moderate
-  Minimal



SOURCE: Quaternary Research Group, 1976

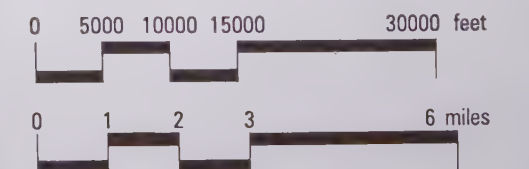


FIG. 47













## **Flood Hazards**

### **■ INTRODUCTION**

This background report examines the types and locations of flooding which occur (or can occur) in the East County, outlines the role of Zone 7 of the Alameda County Flood Control and Water Conservation District in flood control management, and discusses the National Flood Insurance Program in terms of land use regulation in the floodplain.

### **■ EXISTING CONDITIONS**

Flooding in the Livermore-Amador Valley can potentially occur from dam failure and from overtopping of the banks of the arroyos during major storm events.

#### **Dam Inundation**

Substantial portions of the East County (Amador Valley and Sunol Valley) would be inundated in the event of a sudden failure of the Del Valle Dam (Del Valle Reservoir) located south of the City of Livermore; and a portion of Sunol Valley would be inundated from failure of the Turner Dam (San Antonio Reservoir) located east of Sunol Valley. The most likely cause of dam failure is an earthquake. All dams are annually inspected based on current state of the art standards under the direction of the Water Resources Department, Safety of Dams Division. In a special investigation conducted in the 1970s under the National Dam Inspection Program, the U.S. Army Corps of Engineers determined the Turner Dam to be safe. (A similar study on the Del Valle Dam, constructed in 1968, was considered to be unnecessary.) Although dam failure is unlikely, state legislation requires dam inundation maps and Dam Failure and Evacuation Plans for all dams whose failure could result in death or personal injury. The County Office of Emergency Services is responsible for all flood emergency plans and procedures and has prepared such maps and plans for the Del Valle and Turner Dams. The limits of the potential inundation from dam failure are detailed on Figures 48 and 49.

#### **Flood Plain Inundation**

Historically, the East County has been subject to relatively frequent and substantial flooding. The upland areas surrounding the Livermore-Amador Valley are large contributors to the watershed and respond rapidly to precipitation events. Once the runoff reaches the flat valley floor from the uplands, overbank flow may occur because the shallow natural channels carved in the valley's alluvial deposits have insufficient capacity to convey the runoff generated from the larger watershed in the upland areas. Erosion due to development or improper land use activities has generated excessive sediment loads which contribute to decreased channel and reservoir capacity and increased flood hazards along stream reaches.

Areas subject to flooding in the 100-year storm event in the Livermore-Amador Valley have been mapped by the Federal Emergency Management Agency (FEMA) with the most recent update occurring in 1986. These flood hazard maps are used by Alameda County to enforce existing flood plain regulations in unincorporated areas as part of FEMA's regular program of flood insurance under the Flood Disaster Protection Act of 1973. (Similar maps are also used by the cities to enforce flood plain regulations in the incorporated areas of the Livermore-Amador Valley.) As discussed below, the program allows property owners in participating communities to purchase flood insurance at federally subsidized rates if development conforms to certain land use regulations. Although flood hazard protection is most easily achieved by developing outside of the flood plain, Alameda County's Flood Insurance Ordinance (1980) requires that structures built in flood hazard areas shall have the first floor above the 100-year flood elevation and that new development not be allowed that would increase damage to any other property or would diminish the existing degree of flood protection. (The Ordinance consists of amendments to the Building and Subdivision Ordinance to comply with the National Flood Insurance Program - see below.) Some of the major arroyos which have been mapped in the study area are: Arroyo Valle, Arroyo Mocho, Arroyo Las Positas, Arroyo de la Laguna, and Arroyo Seco. See Figure 37 for locations of the arroyos.

### **Flood Control Management**

The responsibility for major flood control projects within the East County lies with Zone 7 of the Alameda County Flood Control and Water Conservation District. Zone 7 improves and maintains existing flood control channels, i.e., the natural drainage system of arroyos. Extensive flood channel improvements have significantly reduced flood hazards for low magnitude events, although certain portions of the Valley remain within flood-prone zones for large storm events (see Figure 50). Zone 7 is currently in the process of updating a master plan for the construction of improvements to the existing channel system throughout the planning area, according to Charlie Van Katwyk Chief of Flood Control Engineering (refer to Figure 37 for details). Zone 7's existing Master Plan of authorized flood control projects allows for channel (arroyo) improvements as development occurs. Most flood-prone areas on the Valley floor will be eliminated as the planned flood control system is completed.

Flood control management is supplemented by the County's Public Works Agency which installs and maintains a storm drainage system composed mainly of curbs and gutters, underground storm pipes, culverts and roadside ditches, all of which feed into the major flood control channels managed by Zone 7.

Arroyo Mocho and Arroyo Las Positas. Unincorporated land on either side of El Charro Road between the City of Pleasanton and the City of Livermore is currently subject to extensive flooding due to the limited channel capacity of the arroyos which converge 2,000 feet west of El Charro Road. Planned improvements for this area include the realignment of the confluence of the arroyos to just east of El Charro Road and widening of the Arroyo Mocho channel (as the channel is called after the confluence) west of El Charro Road.

Arroyo del Valle. For purposes of flood control, Zone 7 considers Arroyo del Valle's natural floodplain to be the channel capable of conveying the 100-year flood. The 100-year flood plain



along the stretch of Arroyo del Valle between the US Veterans Administration in the South Livermore Valley, along Vineyard Avenue, to the city limits of Pleasanton is, in many areas, more than 1,000 feet in width. Because land adjacent to the arroyo is virtually undeveloped, Zone 7 has not identified the stretch as needing flood control improvements, and the Arroyo del Valle may be left in its natural state (personal communication with Vincent Wong, Manager of Environmental Resources, Zone 7 of Alameda County Flood Control and Water Conservation District, August 29, 1990). However, if development is proposed adjacent to the arroyo, Zone 7 would recommend the developer provide bank stabilization to ensure that adequate local flood hazard protection is provided. In general, it is the policy of Zone 7 to accommodate flood control solutions which leave the arroyos in as natural a state as possible.

Arroyo de la Laguna and Alameda Creek: Improvements are being considered on the channel segment of Arroyo de la Laguna south of Bernal Avenue to Castlewood Country Club due to the narrow width of the arroyo which causes upstream flooding in the City of Pleasanton during the 100-year storm event. At the present time, Alameda Creek in Sunol Valley and Arroyo de la Laguna south of the City of Pleasanton below Castlewood do not need increased flood carrying capacity. Segments of both Arroyo de la Laguna and Alameda Creek have significant riparian habitat (see the *Biological Resources* background report in Section E).

Chain-of-Lakes. Management of the "chain-of-lakes" may also meet some flood control objectives. Under the Livermore-Amador Valley Quarry Area Reclamation Specific Plan, the pit areas of the three existing adjacent gravel quarries located in the area of El Charro Road between the existing cities of Pleasanton and Livermore will be reclaimed as a series of connected "lakes". This "chain-of-lakes", to be in operation by 2030 when final reclamation of the area is anticipated to occur, will provide a surface water storage, groundwater recharge, and conveyance system that will be dedicated to and operated by Zone 7 for groundwater management.

### **Zone 7 Drainage Impact Development Fees**

Channel improvements are paid for with development fees under a capital improvement program. Zone 7 charges a drainage fee to persons developing property within the Zone's drainage district (known as Special Drainage Area 7-1 or SDA 7-1). The fee schedule is as follows: \$540.00 per single-family dwelling; \$360.00 per multi-family dwelling; 11.3 cents per square foot of impervious surface (building, parking area, accessory structures, sidewalks, etc.) for non-residential development.

The money from the special drainage fund is used to reimburse developers who improve the drainage channel/creeks to meet Zone 7 flood control standards. In order to be eligible for reimbursements, the developer must enter into an agreement with Zone 7 prior to making improvements. Improvements include channel excavation, access road, fencing, aggregate, revegetation, hydroseeding, etc. The creek must be improved prior to Zone 7 accepting responsibility for maintenance and operations. The developer usually receives between 75 to 90 percent of costs; other agency permits (U.S. Corps of Army Engineers and California Department of Fish & Game) and associated costs are not reimbursable by Zone 7.



## **Zone 7 Arroyo Management Plan**

The Arroyo Management Plan (adopted 1985) is a master plan for public recreational access along flood control channels and arroyos on lands owned by Zone 7. The Arroyo Management Plan contains policies for development, operation, maintenance, and security of the Arroyo Trail and Recreation Plan. The Management Plan also provides typical design standards and locations of trails and other recreational facilities.

## **Flood Insurance Program and Community Rating System**

The Alameda County Public Works Agency is responsible for administering the National Flood Insurance Program (NFIP) and the Community Rating System for unincorporated areas of Alameda County. The NFIP provides homeowners in communities that participate in the program with federally-backed flood insurance. In order for a community to participate in the program, it must adopt and enforce a floodplain management ordinance to regulate new development in flood hazard areas. The purpose of the ordinance is to ensure that new development does not increase existing flooding conditions and that new buildings will be protected from flood damage, especially from 100-year floods.

The Community Rating System (CRS) is an incentive program for those communities that wish to establish controls that exceed the minimum NFIP program requirements that prevent or reduce flood losses. The CRS program includes activities that prevent or reduce flood impacts to existing development, while the NFIP only affects minimum standards for new construction. Under the CRS, flood insurance premium rates are adjusted to reflect community activities to reduce flood damages to existing buildings, to manage development in areas not mapped by the NFIP, to protect new buildings beyond the minimum NFIP protection level, to help insurance agents obtain flood data, and to help people obtain flood insurance.

The CRS program is voluntary and communities must submit documentation that the community is implementing one or more activities recognized in the CRS Schedule. The CRS Schedule identifies 18 activities organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness. Some CRS activity areas have been identified which require land use policies in the General Plan to improve the County's CRS rating. These activity areas include: Open Space Preservation (Activity 420); Higher Regulatory Standards (Activity 430); and Storm Water Management (Activity 450).

Open Space Preservation. This activity provides credit to the County for having flood-prone property permanently preserved as open space. The CRS program recognizes three types of open space capable of preserving flood prone areas:

1. Publicly-owned land that is used for state or local parks, portions of which are located within the regulatory floodplain.
2. Privately-owned preserve land (i.e., Audubon Society preserves, church retreat properties, hunting club lands, etc.) maintained as open space for nature or wildlife preserves.

3. Restrictive development regulations that prevent the construction of buildings or placement of fill or other obstructions in the regulatory floodplain (but does not remove all property rights).

Credit is also given for open space parcels that are protected by deed restrictions. Open space as defined by the CRS program "...must be free from buildings, filling or other encroachments to flood flows (420-1)." The program does not restrict the use of open space designated lands for use as parking lots and driveways for parks. Open space designated properties where deed restrictions have been placed on them are given additional CRS credit.

Higher Regulatory Standards. This activity provides credit to communities for regulations that require new development to exceed NFIP minimum standards. Possible acceptable regulations include: requiring floor levels of residences to be higher than the base flood elevation; protecting foundations from scouring; maintaining floodplain storage by prohibiting fill or by requiring compensating storage; and, zoning for low density development in 100-year floodplain areas.

Storm Water Management. The storm water management activity provides credit to communities that have development regulations that minimize the impact of new development on surface water drainage and runoff. Urbanization, or the conversion of undeveloped land to impermeable surfaces, increases the rate (sometimes as high as five-fold) at which rainfall runs off surfaces. The result is flooding that is quicker, more frequent and more severe.

The CRS program identifies four approaches to regulate new development in the watershed:

1. Regulate new development on a case-by-case basis to ensure that peak rate flow of storm water from new development will not increase the rate of runoff from the site in its undeveloped state. This approach would require the use of storm water retention/detention basins to slow the rate of runoff to pre-development rates of flow or hold the storm water flow on site.
2. Regulate new development on a regional or watershed basis via a storm water management master plan that analyzes the combined effects of existing and proposed new development on storm water drainage within the watershed. The master plan approach would coordinate the timing and total volumes of peak flows from various sub-basins within the watershed.
3. Require all new buildings, in addition to those in the floodplain, to be protected from local drainage problems.
4. Regulate construction to minimize erosion and channel sedimentation.

The CRS program states that these activities should not be implemented solely to earn CRS credit but should be attempted in conjunction with achieving other community goals.



## ■ PLANNING CONSIDERATIONS

### Flooding Potential

In general, further urbanization will increase flood hazard potential by increasing the magnitude and frequency of runoff (a result of increased impervious surface) and by any siting of development on or adjacent to the flood plain. Land use policies and regulations developed for the Flood Insurance Program and Community Rating System together with Zone 7's flood control improvement program and the incorporation of detention/retention facilities into site development as called for in the County's Storm Water Management Plan (see "Water Resources") will minimize the risk of flood hazards in the planning area. These programs should be supported by County policy.

Multi-Use Design of Flood Control Improvements. Flood control improvements should be integrated with other community needs (open space and recreation) and resource protection goals (such as fish and wildlife habitat, groundwater quality, and soil conservation). This multi-use objective can be achieved in two ways: (1) by providing design guidelines for use in project review of flood control features, especially arroyo improvements and onsite detention/retention basins; and (2) by promoting an integrated agency approach to plans, regulations, and programs which pertain to use of the arroyos and basin features. The following list is suggestive of the overlapping goals represented by these agencies:

- Zone 7 Flood Control Improvements Master Plan
- Zone 7 Arroyo Management Plan
- FEMA Flood Insurance Program and Community Rating System (as administered by Alameda County Public Works Agency)
- Storm Water Management Plan for the Alameda County Urban Runoff Clean Water Program (as administered by Alameda County Public Works Agency)
- Alameda County Planning Department (design considerations and project review)
- East Bay Regional Park District
- Livermore Area Recreation Park District
- California Department of Fish and Game and the U.S. Fish and Wildlife Service (considerations relating to biological resources)

Policies should be formulated to address the integration of the above plans or concerns regarding flood control features. Currently, setbacks, required of development on adjacent land, are of sufficient width to accommodate only necessary flood control improvements. Wider setbacks would allow channel design to incorporate gentler channel slopes, trails, and the planting of riparian vegetation.

### Flood Insurance Program and Community Rating System

The Alameda County Public Works Agency has requested that the Planning Department develop policies in the General Plan that would assist in improving the County's CRS rating and therefore reduce the flood insurance premium for County residents who purchase flood insurance.



## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- *Provision of adequate storm drainage and flood control systems to serve existing and future development*
- *Fair-share payment of the costs of storm drainage and flood control improvements by new development*
- *Preservation or replacement of riparian habitat along flood control channels*
- *Promotion of multi-use objectives in the design of on-site and off-site flood control features*
- *Protection of new development from 100-year flood hazards*
- *Improvement of the County's rating under the National Flood Insurance program*

## SOURCES

Alameda County, Seismic Safety and Safety Elements of the County of Alameda General Plan, August 5, 1982.

Alameda County, Specific Plan for Livermore-Amador Valley Quarry Area Reclamation, November 5, 1981.

Alameda County, Conservation Element of the Alameda County General Plan, 1976.

Alameda County, Flood Insurance Ordinance, as revised August 15, 1980.

California Department of Water Resources, Livermore and Sunol Valleys-- Evaluation of Groundwater Resources, Appendix A: Geology, 1966.

Federal Emergency Management Agency, Flood Insurance Study (and Flood Insurance Rate Maps) Alameda County, California, Unincorporated Areas, as revised February 19, 1986.

U.S. Army Corps of Engineers, San Francisco District, Upper Alameda Creek Urban Study Background Information Appendix, 1985.

Zone 7, Fall 1991 Groundwater Contour Map, 1992.

Zone 7, personal communication with Charlie Van Katwyk, Chief of Flood Control Engineering, June 17, 1992.

Zone 7, personal communication with Vincent Wong, Manager of Environmental Resources, August 29, 1990.

## Fire Hazards

### ■ INTRODUCTION

This chapter discusses potential fire hazards in the East County. There are two basic types of fires which occur in the planning area: wildland fires and urban fires. Fires occurring in developed areas are usually structural fires, rubbish fires, automobile fires or grass fires on vacant lots. Fires in undeveloped areas include large brush, grain, and grass fires that can engulf hundreds or thousands of acres. Since the hazards, land-use relationships and mitigation measures differ for these two fire categories, they are frequently discussed here separately. Fire protection services are described elsewhere in the *Fire Protection* background report, Section D.

### ■ EXISTING CONDITIONS

#### Wildland Fires

A combination of highly flammable vegetation, steep slopes, and long, dry summers (often with high wind conditions) creates a significant threat of large wildland fires in the East County. This threat is greatly exacerbated by the large number of people who live, work and recreate in these areas, as wildland fires are usually caused by human activities such as equipment use or smoking.

Once a wildland fire has been ignited, its progression is affected by three environmental factors: fuel loading, climate and topography. Fuel loading is a function of the quantity and type of vegetation available for burning. The main climatic determinants for wildland fires are wind speed, temperature, and relative humidity. Fuel loading and climatic conditions are combined to form a Fire Load Index, which is expressed on a linear scale of 0 to 100. An index rating of 28 to 39 means that the expected fire load is very high, while a rating of 40 or above is considered extreme.

Topography influences wildland fire behavior and the ability of firefighters to suppress fires once they occur. Fires tend to burn more rapidly upslope than down, and the steeper the slope the more rapidly the fire spreads. Steep slopes also contribute to the channeling effects of winds, which spread fires more quickly. In addition, steep slopes increase travel times for fire vehicles, and restrict the available firefighting methods. The California Department of Forestry (CDF) defines three classes of slopes in calculating the topographic effects on fire severity. The definition of these three classes in Alameda County are summarized on the following chart:



<u>Class</u>	<u>Slope</u>	<u>Possible Firefighting Methods</u>
I	0-30%	Direct attack possible with all-drive firetrucks, bulldozers, handcrews and aircraft.
II	31-50%	Beyond operating capability of all-wheel drive vehicles. Drive attack possible with bulldozers, handcrews and aircraft.
III	50% +	Mostly beyond operating capability of bulldozers. Handcrews and aircraft become primary tools.

CDF has developed a Wildland Fire Severity Scale which defines fire hazard categories based on a combination of the environmental factors mentioned above (see Table F-1). "Moderate" hazards are generally found in grasslands, where fires burn with fairly low heat and are relatively easy to control; as can be seen from Figure 51, this is the most common predominant hazard level in the East County. "High" hazards tend to be found on hillier terrain; not surprisingly, this hazard level is found throughout the mountainous southern portion of the planning area. No "low" or "extreme" hazard areas exist in the East County as currently mapped, although it should be noted that CDF is in the process of revising its fire hazard maps for the planning area. The revised maps will be the product of a more detailed fire hazard model which incorporates factors such as structural density and fire history in addition to the environmental components discussed above.

While fire hazards are a problem in the vast majority of the planning area, several sections are of particular concern. The grasslands near Altamont in the eastern part of the County are one such area. This region is known for its strong winds and hot summer weather, and has a history of frequent, often severe, wildfires. Del Valle Regional Park is another area which is considered to pose a major fire risk, due in large part to the high level of human activity in the park (although the actual incidence of fire in recent years has been fairly low).

### **Urban Fires**

As noted above, urban fires include structural fires, rubbish fires, automobile fires or grass fires on vacant lots. Structural fires are the most common, and fall into two basic categories: those which are externally caused (e.g., from vegetation outside of a home) and those which are internally caused (e.g., through faulty electric wiring). Certain types of structures pose greater fire hazards than others. The most serious hazards tend to be found in structures which accommodate large numbers of people; these include multiple residential structures, public assembly buildings, institutions (such as schools or community centers), and shopping centers. Among single-family residential structures, mobile homes are considered to pose the greatest fire risk since they tend to burn more quickly than other housing types.

**Table F-1**  
**FIRE HAZARD SEVERITY SCALE \***

CRITICAL FIRE WEATHER FREQUENCY →	I (1)			II (2)			III (8)		
	SLOPE %			SLOPE %			SLOPE %		
FUEL LOADING ↓	0-40 (1)	41-80 (1.6)	81+ (2.0)	0-40 (1)	41-80 (1.6)	81+ (2.0)	0-40 (1)	41-80 (1.6)	81+ (2.0)
Light (Grass) (1)	1	1.6	2	2	3.2	4	8	12.8	16
Medium (Scrub) (8)	8	12.5	16	16	25.5	32	64	102.4	128
Heavy (Woods-Brushwood) (16)	16	25.6	32	32	51.2	64	124	202.8	256

1-12.8

MODERATE  
HAZARD

16-32

HIGH  
HAZARD

128-256

EXTREME  
HAZARD

\* Severity Factor Values are shown in Parantheses in the Table.

## Recent History

Within the last 20 years there have been no significant fires in the unincorporated portion of the County that have not been controlled within a few hours by available resources (including, in certain instances, mutual aid assistance). Some large residential and commercial building fires have occurred, but there have been no fires which have warranted a Disaster Declaration. However, the East County's good fortune during this period should not be cause to underestimate the area's tremendous fire potential. Even the most cursory look at the recent history of other areas of Alameda County (most notably, the hills of Oakland and Berkeley) underline the hazards inherent in much of the planning area, particularly with respect to the urban/wildland interface.

### *Fire Safety Guide for Residential Development in California*

CDF has developed a fire safety guide for wildland development in hazardous areas. These guidelines apply to all State Responsibility lands in California (which includes the CDF-administered portion of the planning area) but are not mandatory in other parts of the state. The central component of the guide is a set of fire safety standards, which are broadly summarized in Table F-2.

### *Fire Protection Master Plan*

The Alameda County *Fire Protection Master Plan*, adopted by the Board of Supervisors in February 1992, makes a number of recommendations for improving fire safety in the County. Some are designed to improve the efficiency and effectiveness of fire services, and are consequently discussed in the "Public Services" section of this document. The Plan also proposes the implementation of risk management programs in areas such as fire-resistive construction, code enforcement, fire safety education and built-in fire protection systems. The Plan includes a set of "Wildland Fire Safety Requirements", which have been developed as guidelines but have not been adopted by ordinance. These guidelines--which do not apply to State Responsibility Areas protected by CDF--address the following issues:

- o Firebreaks
- o Fuel modification
- o Chimneys and stovepipes
- o Overhanging vegetation
- o Roof vegetation
- o Access
- o Protection of exposures
- o Chimney spark arresters
- o Attic openings
- o Roofs



TABLE F-2

***Fire Safety Guide For Residential Development In California:  
Summary of Subject Headings***

<p><b>Access/Traffic Circulation</b></p> <ul style="list-style-type: none"> <li>o Access Routes</li> <li>o Road Width</li> <li>o Cul-de-Sacs</li> <li>o Street Grades</li> <li>o Street Radius</li> <li>o Vertical Dips</li> <li>o Bridges</li> </ul> <p><b>Street, Road and Building Identification</b></p> <ul style="list-style-type: none"> <li>o Buildings and Structures</li> <li>o Roads and Streets</li> </ul> <p><b>Roadside Vegetation</b></p> <ul style="list-style-type: none"> <li>o Clearance Distances</li> <li>o Methods of Fuel Treatment</li> </ul> <p><b>Water Supply</b></p> <ul style="list-style-type: none"> <li>o Water Mains</li> <li>o Fire Hydrants</li> <li>o Water Storage</li> <li>o Private Water Supply</li> <li>o Lakes, Ponds, Streams, Swimming Pools and Other Water Sources</li> </ul> <p><b>Roofing</b></p> <ul style="list-style-type: none"> <li>o Tile Roofs</li> <li>o Shake/Shingle Roofs</li> <li>o Roof Sprinkler Systems</li> </ul>	<p><b>Building Construction Standards</b></p> <ul style="list-style-type: none"> <li>o Uniform Building Code</li> <li>o Local Regulations or Ordinances</li> <li>o Eaves, Balconies, Unenclosed Roofs and Floors</li> <li>o Vents</li> <li>o Chimney</li> <li>o Exterior Walls</li> <li>o Rafters</li> <li>o Windows</li> <li>o Existing Buildings or Structures</li> </ul> <p><b>Building Spacing and Densities</b></p> <ul style="list-style-type: none"> <li>o Building Spacing</li> <li>o Building Density</li> </ul> <p><b>Vegetation Clearance</b></p> <ul style="list-style-type: none"> <li>o Firebreaks</li> <li>o Fuel Modification</li> <li>o Chimney and Stovepipes</li> <li>o Overhanging Vegetation</li> <li>o Accumulated Roof Debris</li> <li>o Local Ordinance Adoption</li> </ul> <p><b>Fuelbreaks and Greenbelts</b></p> <ul style="list-style-type: none"> <li>o Plans</li> <li>o Design and Construction</li> <li>o Access</li> <li>o Openspace</li> <li>o Primary Fuelbreaks</li> <li>o Secondary Fuelbreaks</li> </ul>
<p><b>Source:</b> California Department of Forestry and Fire Protection, 1980.</p>	

***Fire Hazard Mitigation Plan***

One outgrowth of the catastrophic Oakland/Berkeley firestorm in 1991 was the *Hazard Mitigation Plan for Fires in the Unincorporated Areas of Alameda County*, the preparation of which was one of the conditions for receiving federal disaster aid. The following mitigation projects are listed in the plan:

- o Vegetation management programs
- o Development of fire standards for urban/wildland interface areas
- o Review of the General Plan fire section and zoning ordinances
- o Participation of fire districts in planning process

- o Possible adoption of roofing standards
- o Possible adoption of current California Building and Fire Codes
- o Update of fire hazard maps
- o Participation in National Weather Service fire alert system
- o Provision of fire safety materials to community
- o Possible adoption of access standards for urban/wildland interface
- o Enforcement of fire safety standards during development/building process
- o Possible adoption of a residential sprinkler ordinance
- o Development of a regional 800 MHz communication system

## ■ TRENDS

### **Continued Expansion of the Urban/Wildland Interface**

California's explosive population growth in recent decades has been accompanied by increasing urban expansion into wildland areas. Development has altered the physical composition of these areas, intensifying wildland use through the construction of homes, cabins, subdivisions, resorts, recreational facilities, businesses, etc. The expansion of such uses into wildland areas has exacerbated their already-high fire potential, and increased the danger to adjoining communities as well. The applicability of this danger to the Bay Area was evidenced by the catastrophic Oakland/Berkeley firestorm of 1991, which occurred in the western portion of Alameda County.

Since 90 percent of all wildland fires in California are human in origin, it is hardly surprising that increased development in wildland areas has increased the hazard level. However, expansion of the urban/wildland interface has also augmented fire risks in a more indirect sense. As more and more Californians move to wildland areas, fire suppression efforts prevent smaller, naturally-occurring fires from taking place. As a result, more and more natural fuel piles up in these areas--fuel which would have, in all probability, been burned away had the land been left undeveloped. The upshot is that the potential for large, uncontrollable wildfires has been increasing throughout California (and in many portions of the planning area).

### **Increased Knowledge of Fire Hazards**

Considerable progress has been made in recent decades in the understanding of fire hazards. Knowledge of the factors which contribute to fire hazards--and the steps which can be taken to mitigate them--has increased significantly. New prevention measures, fire-fighting techniques, and wildland management concepts have combined to at least partially offset the growing fire danger in California. Many of these measures, techniques and concepts are discussed below under "Fire Protection Planning".

## ■ PLANNING ISSUES

### Fire Protection Planning

Integrated fire protection planning should generally include the following elements: land use; topography (to identify those areas where fire risks are sufficiently high to preclude development); traffic flow (to provide for adequate fire access and public evacuation); water (to ensure that distribution and source facilities are sufficient to support necessary flow); and a system of fuel breaks and fire roads. These basic elements are addressed in greater detail in the plans/guidelines discussed later in this section.

Wildland. Wildland fire hazards can be approached in three different ways: 1) attacking the root causes; 2) reducing the loss potential; and 3) modifying the hazard. The two basic causes of wildland fires are humans (which account for 90 percent of the cases) and lightning (which accounts for 10 percent). Neither of these causes is easily mitigable, although safety education programs can be used to reduce the human fire potential somewhat (this option is only of limited use, however, since arson accounts for a large percentage of these fires). Decreasing loss potential is usually a function of increasing the number of people and equipment with which to fight fires; this is often accomplished through mutual aid agreements, as is the case in the planning area.

Modifying a fire hazard is generally effected by altering an area's fuel load (since climate and slope, the other main determinants of wildfire severity, are obviously quite difficult to modify. The two primary methods of modifying fuel load are fuelbreaks and prescribed burning. Fuelbreaks are wide strips of land that have been cleared or converted to less hazardous types of vegetation. Main ridges or side ridges are generally selected for fuel breaks. Prescribed burning is the planned application and confinement of a fire to a pre-selected land area in order to break up large wildland areas and reduce the quantity of built-up brush.

One way to codify these approaches to wildfire risk reduction is to incorporate the Fire Hazard Severity Scale into planning policies. Standards for density, spacing, setback, access, water supply, building design/construction, vegetation clearance, etc. can be specifically geared to the three fire hazard severity classes.

Urban. Externally-caused urban fire hazards can be reduced by adopting standards for spacing of structures, access, water supply, building design/materials, and clearance of vegetation around structures. Internally-caused urban fire hazards can be reduced by public education, inspection of existing structures, and correction of dangerous conditions. Structural standards (e.g., building design standards for roofing, vents, glass, siding and overhangs) can be integrated with the Fire Hazard Severity Scale and applied through adoption of the Uniform Building Code and Uniform Fire Code.



## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

### **General**

- o Adherence to the provisions of the Fire Protection Master Plan and the Fire Hazard Mitigation Plan*
- o Design of all new rural residential development--particularly that which lies within high fire hazard areas--so as to minimize risks to life and property*
- o Approval of new development and land division in high fire hazard areas is only where it is determined that an adequate water supply is or can be made available*
- o Maintenance or improvement of existing ISO ratings for the planning area*
- o Consideration, in reviewing projects, of the severity of natural fire hazards, potential damage from wildland and structural fires, and the adequacy of fire protection services and available water supply*
- o Referral of land development and residential building permit applications to the County Fire Department, or pertinent local fire district, for review and recommendation*

### **Urban Fires**

- o Restriction of development in wildland areas which coincide with high fire hazard zones (as identified by the Fire Hazard Severity Scale)*
- o Adoption of regulations regarding clearance around structures, minimum road widths, evacuation routes and maximum road grades*
- o Establishment of stringent site criteria and construction standards for development in high fire hazard areas; prohibition of construction where these criteria are not met*
- o Development of a comprehensive program (including fuelbreaks, brush management, and controlled burning) to mitigate fire hazards in wildland areas*
- o Development of a fuelbreak program to separate wildland fire hazard areas, provide access for fire suppression equipment and mitigate wildfire risks*
- o Coordination with local agencies to develop a program of fire reduction by animal grazing*

***Structural Fires***

- o Establishment of requirements, in fire hazardous areas, for the use of fire-resistant building materials, landscaping with fire-resistant plants, and provision of adequate clearance*
- o Possible adoption of a County ordinance requiring the preparation of disaster response plans for buildings that are more than 3 stories or 30 feet tall; indoor public assembly facilities, and facilities housing dependent populations*

## SOURCES

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## Geologic Hazards

### ■ INTRODUCTION

This report discusses geologic hazards in the planning area. Most of these stem from factors relating to soil conditions (such as erosion or shrink-swell potential) or seismicity (surface rupture, groundshaking, etc.). For a broader perspective on soil conditions and seismicity, see the *Geology* background report in Section E.

### ■ EXISTING CONDITIONS

#### Physical Setting

Erosion Potential. Upland areas cover approximately 72 percent of the planning area (see Figure 52 for locations). Approximately this proportion of the East County may be said to have soils with some degree of erosiveness (erosiveness depends primarily on slope and secondarily on the amount of vegetative cover). These areas may consequently be constrained, to varying degrees, in their potential for development--their holding capacities may be restricted, or they may necessitate special considerations relating to design, construction and engineering. Erosiveness is also an issue with respect to other uses--for example, erosive soils are common in hill areas where grazing takes place. Soils found on alluvial fan and plain areas usually are not very erosive, in the East County as elsewhere.

Shrink-Swell Potential. Shrink-swell, or soil expansiveness, is a condition in which soil reacts to moisture variations by expanding or contracting as moisture infiltrates or evaporates. On open soils, this is manifested by swelling and softening of soil during rainy periods, and subsequent shrinking and cracking of the drying surface crust as moisture evaporates. Unlike erosion, shrink-swell potential is not related significantly to slope; however, this characteristic does affect development, and can necessitate special design considerations. Stability of foundations or pads may be affected significantly by soil expansiveness, and improper design can result in settling or buckling.

All soils exhibit some degree of shrink-swell potential, but the amount of soil expansiveness varies. The degree of variability in the East County is quite large; soils with a high degree of shrink-swell potential can be found in both uplands and areas of level land. Areas with high degrees of shrink-swell potential include portions of the Dougherty Hills (in the East Dublin sub-area), the West Dublin Hills and the Altamont Hills east of Livermore. Level areas which exhibit this quality include the Las Positas Valley in the North Livermore Valley sub-area.

Landslide Potential. Landslides occur when the shear stress of a soil or rock mass exceeds its shear strength. Shear stress can be increased by adding to the weight of the soil and/or rock mass, saturation or surcharge of loading, or by decreasing needed support from the toe of the

slope by erosion or grading. Zones of low shear strength are generally associated with the presence of certain clays, bedding or fracture surfaces. The motion of the soil under saturated conditions can reduce shear strength and induce landslides. Non-seismic landslides can also be triggered by gravity or human alteration of the natural landscape.

Seismic landslides are, by definition, induced by earthquakes. Landslides are a major effect of ground shaking in earthquakes of magnitude 5 and greater, especially where earth materials are water-saturated. Failure of steep slopes and collapse of natural stream banks could occur widely during a major earthquake. Particularly vulnerable are areas in the Hayward and Calaveras fault zones, which are marked by a succession of geologically-recent slides, many of them highly unstable.

Slope is usually the most important factor contributing to landslide hazards, and potential landslide areas have been identified throughout the hilly portions of the planning area. Areas of particular concern include the Dougherty Hills (in the East Dublin sub-area) and the hills of the Diablo Range in southern and eastern Alameda County (including the Altamont Hills). An extensive landslide could also occur on the east side of Pleasanton Ridge if a major earthquake were to occur on the Calaveras Fault. Additional landslide areas exist in the West Dublin Area.

Landslide susceptibility for the Livermore-Amador Valley (and environs) is shown in Figure 53 (comparable data for the rest of the planning area is unavailable). For the purposes of this map, landslide hazards have been grouped into two categories: **low** landslide susceptibility and **higher** landslide susceptibility. Within the area of low susceptibility, landslides and other features related to slope instability are rare to non-existent. The area of higher susceptibility combines several separate categories. These include "marginally susceptible" areas, which are unlikely to de-stabilize under natural conditions, but may change radically in response to modification of the adjacent terrain; "generally susceptible" areas, which are at or near their stability limits and can be expected to fail, locally, when modified; and "most susceptible" areas, which are considered naturally unstable, subject to failure even in the absence of human activity.

While the landslide hazard zones mapped would not necessarily stem from seismic activity, the areas in question would experience additional forces during seismic events that could also set them into motion. Other portions of the East County not included on these maps could also experience landslides, as there are many rural landscapes with steep slopes and loose, deep soil; however, these areas are not expected to experience significant development during the life of this Plan, and thus are not considered critical hazard areas.

Additional information on landslide potential is contained in Figures 54-58, which map landslide deposits for the entire planning area. While these deposits serve as good indices of possible landslide activity in the future, it cannot be assumed that past landslide patterns will be replicated in years to come.

Ground Shaking. Ground shaking sends seismic waves or motions through the earth away from the epicenter of an earthquake. Earthquake waves, in passing from solid rock to alluvial and water-saturated materials, tend to become reduced in velocity and increased in amplitude, so that accelerations become greater. Ground motion lasts longer on these looser, less-dense soils than



it does on rock, and is also amplified to an unknown extent. Due to a combination of this and other factors, structures located on such materials suffer far greater damage than those located on solid rock; indeed, this factor has proven in many earthquakes to be a greater hazard than proximity to the fault and epicenter.

Ground shaking may cause damage to structures, depending upon design, quality of construction, foundation materials, and intensity of the earthquake. Ground shaking can also result in ground failures such as landslides, liquefaction, mud slides or compaction of soils. Figure 59 shows maximum ground shaking intensity for areas in the planning area. As is evident on the map, most of the areas with potential for strong to violent groundshaking are located near active faults or within valley areas where unconsolidated soils exist.

Maximum ground shaking intensities expected for the planning area are generally classified as "strong", with some areas near the Altamont Hills classified as "very strong" to "violent" in the event of an earthquake on the Greenville Fault, which passes through the area. By contrast, existing developed areas in Livermore can expect "weak" to "strong" intensities from earthquakes on any of the major faults, while developed areas in Pleasanton and Dublin would experience "very strong" to "violent" intensities, particularly for earthquakes located on the nearby Calaveras Fault.

Surface Rupture. Surface rupture is a break in the ground's surface associated with movement along a fault. As required by the Alquist-Priolo Special Studies Zone Act (see discussion below) the California Department of Mines and Geology (CDMG) has classified and mapped all known active faults in California capable of surface rupture. ("Active" is defined as any fault that has had movement in the last 11,000 years). Special Studies Zones have been delineated within the planning area by the CDMG for every active or potentially active fault; these faults are shown in Figure 30.

Within Alameda County, surface rupture has been documented along the Hayward Fault (as a result of earthquakes in 1836 and 1868) and possibly on the Calaveras Fault (correlated to the earthquake of 1861). While it is generally assumed that surface ruptures will be repeated along active fault traces, the historical record in California is too short to provide conclusive evidence on this point.

Subsidence. Subsidence is the sinking or settling of land. It often occurs as the result of water, oil, or gas extraction, but also occur in connection with earthquakes. No evidence of such movements has been observed in connection with any Bay Area earthquakes, however.

Lateral Spreading and Differential Settlement. Lateral spreading and differential settlement occur when severe ground motions cause a rapid compaction and settlement of underlying soil. Widespread settlements will have effects similar to those resulting from subsidence, while differential movements can lead to building damage and tilting. Unconsolidated sediments are the most susceptible to these hazards; areas in the East County that may be so affected are generally limited to stream corridors underlain by recent stream deposits, and places affected by recent debris flow or landslide deposits. These areas have not yet been mapped by the State Geologist, but it is unlikely that large portions of the planning area would be so affected.



Liquefaction. Liquefaction is the transformation of water-saturated sediments with low cohesion from a solid state to a liquefied state as the material is shaken during an earthquake. The most susceptible sediments to liquefaction are clean, loose, water-saturated fine grained sands within 50 to 100 feet of the surface. Liquefaction hazard zones have not yet been mapped by the State Geologist, but could include portions of the Las Positas Valley (in the North Livermore Valley sub-area) and the Livermore Valley. Other areas that may be susceptible to liquefaction include stream zones and sandy deposits adjacent to them, as well as alluvial valleys with high water tables; examples of such areas can be found in the La Costa Valley (in the South Ridglands sub-area) and the Sunol Valley.

Lurch Cracking. The development of irregular fractures cracks and fissures--largely the result of sliding, settling, shaking and the passage of surface earthquake waves--is generally characteristic of all earthquakes large enough for significant ground motion to occur. Such fractures may be many feet long, and may displace rock and soil both horizontally and vertically. Lurch cracking rarely occurs in solid rock; it is usually confined to weathered rock, alluvium and soil. Extensive and damaging lurch cracking has occurred in loose, water-saturated materials in all moderate to large earthquakes; within the East County, it is most likely to occur in those areas described above as having high liquefaction potential.

Tectonic Creep. Tectonic creep refers to very slow fault displacement which occurs as a result of tectonic forces, causing minor changes in the earth's surface along the fault. Tectonic creep has been documented in the East County along the Calaveras Fault system.

### **Planning for Seismic Hazards**

Alquist-Priolo Act Special Study Zones. The Alquist-Priolo Special Studies Zones Act, enacted by the State Legislature in 1972, requires that geological investigations be conducted to ensure that buildings constructed for human occupation are not built on seismically active faults. The act requires the State Geologist to designate special studies zones in areas of active and potentially active major faults. The State also requires the sellers of property or their agents to inform prospective buyers if a property lies in a special studies zone.

In keeping with the Alquist-Priolo Act, a Special Studies Zone has been delineated around each active fault in the planning area, within which specific geotechnical investigations are required for all proposed development to ensure that inhabited structures are not sited on top of fault lines or in surface rupture zones. The County is required by law to maintain maps of these zones on file. In general, structures are required to maintain a 50-foot setback from all fault traces, or as determined to be necessary by the special study.

Mapping of Seismic Hazards. The Seismic Hazards Mapping Act (SHAMA) of 1990 required the State Geologist to prepare maps identifying seismic hazard zones statewide to cover ground shaking, liquefaction, landslides, and other geotechnical aspects of earthquake effects. The maps, when they become available, must be kept on file with the County in a manner similar to the requirements for the Alquist-Priolo Zone maps, described above. Although most seismic hazard zones have not yet been mapped, the requirements of SHAMA already apply, including

the requirement that geotechnical studies be performed for any development within an identified seismic hazard zone.

Geologic hazard maps for Alameda County have previously been prepared by Woodward-Lundgren and Associates under the auspices of the County Public Works Agency. These maps, prepared in 1973, are generally adequate to determine the need for a detailed, site-specific soil and/or geologic report. Such detailed reports, when necessary, are prepared by private engineering and consulting firms, and reviewed for technical adequacy by the Building Official and the County Engineering Geologist.

Seismic Hazards and Building Types. New buildings are generally designed to withstand substantial seismic shocks, but a substantial number of structures within the planning area were built before local building codes required earthquake bracing. Of these, small wood frame structures are least likely to collapse from earthquake shaking. However, older wood frame structures with inadequate foundation-to-frame connections, or which are weakened by rot or termite infestation, may break from their footings, often rupturing utility connections.

Unreinforced brick, stone or block structures are the most failure-prone building types (although reinforced block and concrete construction can be designed to be quite resistant to earthquakes). Steel frame structures can be designed to withstand strong shaking, and are the preferred type of construction for tall buildings in seismically-active areas. Light steel frame and glass buildings with reinforced concrete roofs can suffer severe damage or collapse due to weak connections between the structural members, as can tilt-up structures.

#### Seismic Hazards and Transportation Facilities

***Streets and Highways.*** A major earthquake would likely have a number of impacts on the streets and highways of the planning area. These could include localized earth failure due to surface rupture and subsidence, and damage to and possible collapse of bridge structures. In addition, there is a high possibility of major landslides under conditions of heavy ground motion in hill areas. These could block portions of several major arterials and freeways, including portions of Interstates 580 and 680.

***Bay Area Rapid Transit (BART).*** The BART system, which is currently being extended into the East County, has been designed and constructed with considerable attention to reduction of seismic hazards. However, BART tracks lying upon soils prone to subsidence may be distorted by even a moderate earthquake, with potential for derailment of high-speed trains. The system has responded to this problem by installing sensors to detect seismic motion, and establishing special procedures to reduce the risk of derailment.

***Railroads.*** Most tracks in the planning area would sustain little damage due to ground shaking. The major risk involves damage to elevated structures or grade separations affected by fault slippage or rupture. It is expected that service would be disrupted where lines cross the Calaveras Fault; it is also possible that ground failures could damage bridges and trestles located on weak soils.



## Seismic Hazards and Utilities

**Gas and Electric Lines.** The most serious damage to transmission lines can be expected in areas subject to ground rupture and severe ground failure. Disruption of gas and electric service is probable in areas traversed by the Calaveras Fault and/or subject to seismically-induced landsliding. Landsliding and ground subsidence are the most common cause of gas pipeline breaks. Damage to electric and gas lines can also be expected when they are located in highways or bridge structures subject to damage or collapse during an earthquake.

**Fuel Pipelines.** Damage to major gas and oil pipelines can be expected where they cross active fault lines, or are located in soils subject to lurch cracking, subsidence, or landsliding. Most gas lines are equipped with automatic shut-off valves to prevent flow from continuing if damage occurs.

**Water Supply Facilities.** Pipeline breaks are usually induced by fault rupture, landsliding or subsidence. In areas subject only to ground shaking, interruption of water supply by broken mains is relatively unlikely (most pipelines, if in reasonable physical condition, are flexible enough to withstand ground shaking without significant damage). Large lakes and reservoirs (such as San Antonio and Del Valle) are inspected by the State Division of Dam Safety to ensure that the risk of seismically-induced damage is acceptably low.

Major water distribution systems (i.e., the Hetch Hetchy and South Bay Aqueducts) have been designed to withstand some degree of fault displacement without damage. However, it is not known whether these systems could withstand the degree of displacement likely from a major earthquake on the Hayward or Calaveras faults.

**Sanitary Facilities.** Damage to sewage collection systems would be minimal in areas subject only to ground shaking, and moderate to severe where lines are subject to landsliding and subsidence.

## **Regulatory Setting**

State of California. State legislation addressing seismic and geologic hazards include the following:

- o Sections 65302 (f) and 65302.1 of the Government Code require seismic safety and safety elements in all city and county general plans.
- o Sections 660-662 and 2621-2625 of the Public Resources Code require the State Geologist to delineate special studies zones encompassing potentially and recently active fault traces (Alquist-Priolo Act). The Code prohibits the construction of most structures intended for human occupancy on or across the traces of active faults and requires local governments to implement programs to precisely locate fault traces and regulate development within the mapped zones. Special studies zones in or near the planning area are found along the Hayward, Calaveras, Greenville, Las Positas and Verona Faults.



- o Sections of the Education Code require that geological and soil engineering studies be conducted on all new school sites (as well as certain existing ones) and that public schools be designed for the protection of life and property.
- o Sections of the Health and Safety Code require that certain buildings be constructed to resist lateral forces, and that geological and engineering studies be conducted on each new hospital (or additions which affect the structure of an existing hospital).

#### County of Alameda.

- o Section 2905 of the Alameda County Building Code requires applicants for new construction to submit soils and/or geologic reports for sites affected by a number of geologic and soils conditions, including the presence of primary and secondary seismic hazards. The Code also requires soils and/or geologic reports for certain types of existing occupancies (e.g., assembly halls).
- o The County Grading Ordinance, adopted in 1982, establishes minimum standards for grading and excavation, and for control of erosion and sediment.
- o The County Subdivision Ordinance requires all subdivisions to be accompanied by a soils report, a geologic report, a grading plan, and an erosion control report.
- o The County's Emergency Operations Plan includes an "Earthquake Response Directive" which applies to all portions of the planning area.

### ■ PLANNING ISSUES

Hazards are addressed, from a planning perspective, by recognizing the risks to life and property in different geological zones, and controlling potential land uses accordingly. Residences, public facilities and infrastructure need to be placed in accordance with the geologic constraints of the planning area--both to reduce risk wherever possible, and to allow for appropriate responses in the event of a damaging event.

Few areas in the East County are completely unsuited to development; almost any hazard can be mitigated to some degree through engineering, given sufficient financial resources. Maps identifying seismic or soil-related hazards (such as Figures 53-59) are not absolute; they are interpretive, with numerous caveats, and should not be used to make final determinations on where development is or is not appropriate. However, these maps are useful as a type of warning signal, highlighting areas where more detailed site-specific studies are warranted. They can also be used to provide a very broad sense of likely development patterns in the planning area.

In determining development patterns, and assessing the relative importance of risk reduction, broader public policy concerns must also enter the equation. There are, for example, regional consequences associated with many physical catastrophes, even when the damage from such

events is localized (e.g., commerce and transportation can be disrupted over a large area because of earthquake destruction in a relatively small area). The importance of risk reduction extends far beyond the immediate vicinity of a disaster; loss of life and property can have wide-ranging consequences (e.g., fiscal impacts, insurance considerations, effects on infrastructure) for whole regions or states.

## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- o Regulation of any structure intended for human occupancy near the faults defined by the Calaveras or Greenville Alquist-Priolo Special Study Zones, or any other area posing a significant risk to human life and property due to seismic safety standards*
- o Provision for site-specific studies of any structure intended for human occupancy in areas where landslide activity is likely, or which poses a significant risk to human life and property due to soil and slope stability hazards*
- o Design and construction of buildings to withstand groundshaking forces of a minor earthquake without damage, of a moderate earthquake without structural damage, and of a major earthquake without collapse; critical structures and facilities should be designed and constructed to remain standing and functional following a major earthquake*
- o Design of major transportation facilities (e.g., freeways, rapid transit) to avoid or minimize crossing of active fault traces and accommodate fault displacement without major damage that would cause long-term disruption of service; utility lines should be equipped with mechanisms to shut off flow in the event of fault rupture*
- o Control of development in hill areas in order to minimize erosion and disruption to natural slope stability (through regulation of grading, vegetation removal, irrigation, drainage, etc.)*
- o Regulation of development to ensure it is undertaken in areas of demonstrated or potential slope instability only after existing geological/soil conditions are known and considered*

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## **Electromagnetic Fields**

### **■ INTRODUCTION**

Common sources of electromagnetic fields (EMF) include high voltage, long distance transmission lines, low-voltage distribution lines, substations, electrical service vaults, and appliances such as VCRs, video display terminals, vacuums, hair dryers and toasters. Studies in a number of countries have indicated that electromagnetic fields may pose a health hazard. Over the last several years, members of the medical community, particularly epidemiologists, have raised concerns about exposure to electromagnetic fields and possible links to the development of certain cancers, such as leukemia in children, and brain tumors, leukemia, and lymphoma in adults. Until studies are more definitive, many scientists are recommending that land use policy decisions follow the doctrine of "prudent avoidance" in order to avoid or mitigate impacts to the degree feasible (Slesin, 1991).

### **■ EXISTING CONDITIONS**

#### **Overview**

All electric currents create electric and magnetic fields due to the presence of electric charges. Electric charges with opposite signs attract each other, whereas charges with the same sign repel each other. These forces of attraction or repulsion--when standing still--create "electric fields" whose strength is related to the voltage or "electric pressure" in the circuit.

The most commonly used type of electricity in homes and workplaces is AC or alternating current, in which the current does not flow steadily in one direction but moves back and forth. In the United States, it reverses direction 60 times per second. The unit to denote the frequency is called a Hertz (Hz). As a result, our sources of electricity create electric and magnetic fields.

The frequency range of 30-300 Hz is generally described as "extremely low frequency" (ELF) and the range 3-30 kHz as "very low frequency" (VLF). The acronym ELF-EMF designates the electromagnetic fields associated with both the extremely low and very low frequency ranges. Radios, microwaves and radar frequencies are all above 30 kHz on the electromagnetic spectrum. At power line and video display terminal (VDT) frequencies, the electric and magnetic fields are considered separately. The electric field is related to the voltage on the line relative to the ground. Voltages are either 110 or 220 volts (V) in homes and about 12 kV (kilovolts) on distribution lines and higher on transmission lines (ranging from 69- to 500-kV).

The magnetic field is related to the flow of current (i.e. electrons) in the line. The strength of the magnetic field is measured in milligauss (mG). The strength of the EMF depends on the amount of current flow, not the voltage. The current is a function of energy consumption and is therefore highest during periods of peak energy consumption. The strength of electromagnetic

fields decreases dramatically with distance from the source. The rate of decay depends on the source: electromagnetic fields from appliances fall off quickly, while those from power lines do so more slowly. Electric fields may be blocked by objects such as earth, trees or buildings, whereas magnetic fields are generally not blocked by such objects (Leonard, 1990).

### **Strength and Extent of Magnetic Fields**

[The following discussion of electric transmission and distribution lines and substations is summarized from the American Planning Association summary report entitled Electromagnetic Fields and Land Use Controls (Slesin, 1991).]

Transmission Lines: The magnetic field under a 500-kV line (the highest voltage line generally used for transmission) averages 70 mG (millaGauss), doubling during periods of highest current flow. At the edge of a 65-foot right-of-way (ROW), the field strength averages 25 mG with a peak intensity of 50 mG. The average field at 200 feet from the line is 3 mG, but one can measure peaks of 3 mG or more over the next 100 feet.

Distribution Lines: Distribution lines bring electricity from substations into neighborhoods. They are smaller and have a lower voltage than transmission lines, but can still carry enough current to generate strong localized magnetic fields. Distribution lines do not generally have ROWs to reduce residential exposure--they often run over rooftops or within a few feet of homes.

Substations: Substations are used to "step-down" the electricity's voltage to facilitate the transfer from transmission to distribution lines. The nature of substation EMFs have not been explored. The switching process generates complex transient magnetic fields--at higher than power line frequencies--which may have different and possibly more serious biological effects.

Electrical Service Vaults and Conductors: Vaults and conductors are used to distribute electricity in large buildings. Some surveys indicate that electrical wiring constitutes a major, unrecognized source of exposure. EMFs of over 1,000 mG are not uncommon in the vicinity of electrical service vaults in office buildings.

Appliances: Appliances produce high-intensity EMFs up close, but the fields decay rapidly and are insignificant a few feet from the source. In addition to intensity, the duration of the exposure is important. Video display terminals and electric blankets may pose the most significant risks due to the relatively long periods of exposure. Laser printers and copying machines can also generate high localized EMFs.

### **The Health Effects of EMFs**

The 60 Hz fields differ significantly from other types of electromagnetic energy such as x-rays and microwaves. X-rays have sufficient energy to "ionize" and break-up molecules such as the DNA structure that determines genetic characteristics. With their relatively slow oscillations, 60 Hz fields do not have enough energy to break chemical bonds or to heat body tissues. However 60 Hz fields can produce changes in the levels of specific chemicals the body



manufactures as well as changes in the functioning of individual nerve cells and the nervous system of lower animals. It is not clear whether these changes pose risks to public health (Leonard, 1990).

In 1979, a study conducted in Denver, Colorado indicated that children who lived close to power lines and substations had twice the rate of cancer as similar children who served as controls. A number of studies have indicated that children exposed to 2-3 mG magnetic fields were found to have higher rates of cancer than similar unexposed children (Slesin, 1991).

Several theories have been proposed to explain EMF health effects. One theory is referred to as the "pineal hypothesis" and suggests that both visible light and EMFs can disrupt the functioning of the pineal gland, which is responsible for the generation of melatonin. This hormone helps set the body's circadian (day/night cycle) rhythm and can strongly influence physical and mental health--for instance for inhibiting the formation of tumors. Studies have shown that EMF exposures can suppress melatonin production (Slesin, 1991).

Some studies suggest that there may be cancer risks in the 1 to 5 mG range of EMF exposure.

The U.S. Government's Committee on Interagency Radiation Research and Policy Coordination evaluated the scientific literature on the health effects of low-frequency electric and magnetic fields and concluded that there is no convincing evidence in the published literature to support the contention that exposures to EMFs are demonstrable health hazards.

Radio frequency (RF) radiation emitted from radio transmission is a high-frequency type of electromagnetic radiation. High intensities of RF radiation may be harmful under certain circumstances due to the ability of RF energy to heat biological tissue rapidly. There is disagreement over exactly what levels of RF radiation are "safe," particularly with regard to low levels of exposure. There is currently no official federal standard for exposure of the general public to RF radiation.

### **Regulatory Setting**

No U.S. federal agency has yet set extremely low frequency (ELF) EMF standards. A number of states, however have limited field intensities at certain locations such as at the edge of the right-of-way (see Table F-3). These standards do not approach reducing exposure to levels below the 1 to 5 mG range (the level linked to a higher incidence of cancer in some studies).

The International Radiation Protection Association, whose mission is to review scientific evidence and propose safety standards, has issued draft exposure guidelines for power-frequency electric and magnetic fields. They call for a limit of 5-kVm (kilovolt-meter) for continuous exposures to electric fields and 2,000 mG for magnetic fields (Carnegie Mellon University, 1989).

In a 1989 report to the Congressional Office of Technology Assessment (OTA), a team from Carnegie Mellon University proposed a policy of "prudent avoidance" in which decision makers would "look systematically for strategies which can keep people out of 60 Hz fields arising from





high-frequency (RF) radiation. The FCC now uses the protection guidelines of the American National Standards Institute (ANSI), a non-governmental organization that develops recommended standards for a variety of applications, for purposes of evaluating environmental impact from the RF transmitters it regulates. Public access to broadcasting antennas is normally restricted so that individuals cannot be exposed to high-level fields that might exist near an antenna. (For further discussion of the Federal Communications Commission Monitoring Station, refer to the *Major Public Facilities* background report, Section D).

## ■ TRENDS

### Concern Over Possible Health Risks from EMF Exposure is Increasing

Controversy and concern regarding potential adverse health risks from exposure to electromagnetic fields is wide-spread. Studies at this time are not conclusive. A Consensus group working under the auspices of the California Public Utilities commission (CPUC) has recommended a "prudent avoidance" policy. As a practical matter, "prudent avoidance" means locating people away from high power transmission lines and equipment consuming large quantities of electrical energy. Some shielding mechanisms may reduce the effect of electric fields, but generally are not effective in reducing the effect of magnetic fields.

At this time, it is not clear what aspect (if any) of 60 Hz fields pose risks. There is evidence that suggests that across the range of field strengths commonly encountered by people, stronger fields may not pose greater risks than weaker fields. The usual assumption that "more is worse" may not be correct for the case of 60 Hz fields. With the scientific evidence currently available, it is not possible to establish a "safe field" standard (Carnegie Mellon University, 1989).

## ■ PLANNING ISSUES

The primary planning issue at this stage is developing and implementing a strategy of prudent avoidance. For new facilities, it may be prudent to keep people out of fields to the extent that is reasonably feasible. Taking more drastic action would be costly and disruptive without providing any assurance that public health would be protected.

Some technical solutions do appear to be effective in reducing EMFs. For example, order-of-magnitude reductions of magnetic fields can often be achieved by simple changes in wiring configurations that reduce the distance between wires carrying oppositely flowing currents.

When siting new facilities or upgrading existing facilities, mitigation such as changing the configuration of wires, or expanding right-of-ways should be considered.



## ■ **POLICY IMPLICATIONS**

*Key issues raised in this report are summarized below. Draft policies and programs in Volume 1 of this plan were formulated to address these issues.*

- o Avoidance of sensitive uses/receptors (e.g., schools, hospitals and retirement homes) near sources of electromagnetic fields.*
- o Requiring disclosure of proximity to EMFs in all real estate transactions.*
- o Aligning new transmission lines to avoid residential exposure to the greatest degree possible.*
- o Establishing mitigation plans for all new lines.*
- o Identifying financially feasible means of reducing exposure from existing EMFs.*

## **SOURCES**

California EMF Consensus Group, Issues and Recommendations for Interim Response and Policy Addressing Power Frequency Electric and Magnetic Fields, March 1992.

Carnegie Mellon University, Department of Engineering and Public Policy, Electric and Magnetic Fields from 60 Hertz Electric Power: What do we know about Possible Risks?, 1989

Hester, Gordon L., Electric and Magnetic Fields: Managing an Uncertain Risk, Environment, Volume 34 Number 1, Jan./Feb. 1992.

Leonard, Alvin, Raymond Neutra, Michael Yost and Geraldine Lee, Electric and Magnetic Fields: Measurements and Possible Effects on Human Health from Appliances, Power Lines and Other Common Sources, Special Epidemiological Studies Program, California Department of Health Services, 1990.

Sage, Cindy and Joseph G. Johns, Electromagnetic Radiation: A Case for Relevance in Real Estate Transactions and Eminent Domain, Real Estate Law Journal Vol. 20: 193 1991.

Slesin, Louis, Matthew Connelly and David Bergman, Electromagnetic Fields and Land Use Controls, American Planning Association Planning Advisory Service, Report Number 435, 1991.

U.S. Government's Committee on Interagency Radiation Research and Policy Coordination, Health Effects of Low-Frequency Electric and Magnetic Fields, Environmental Science and Technology, Vol 27, No. 1, 1993.





# Dam Inundation Zones: Bethany, Patterson & Del Valle Reservoirs

LEGEND

 Dam Inundation Zones

NOTE: The inundation limits shown on this map are approximate, and include all potential flooded areas; they are based on topography and the assumption of severe dam failure.



SOURCE: Dam Failure and Evacuation Plan,  
Alameda County Office of Emergency Services, 1981

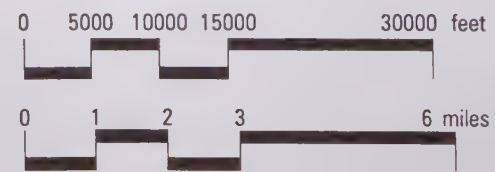



FIG. 48



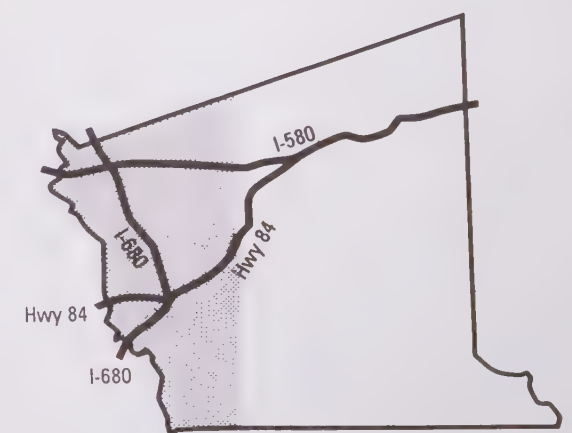
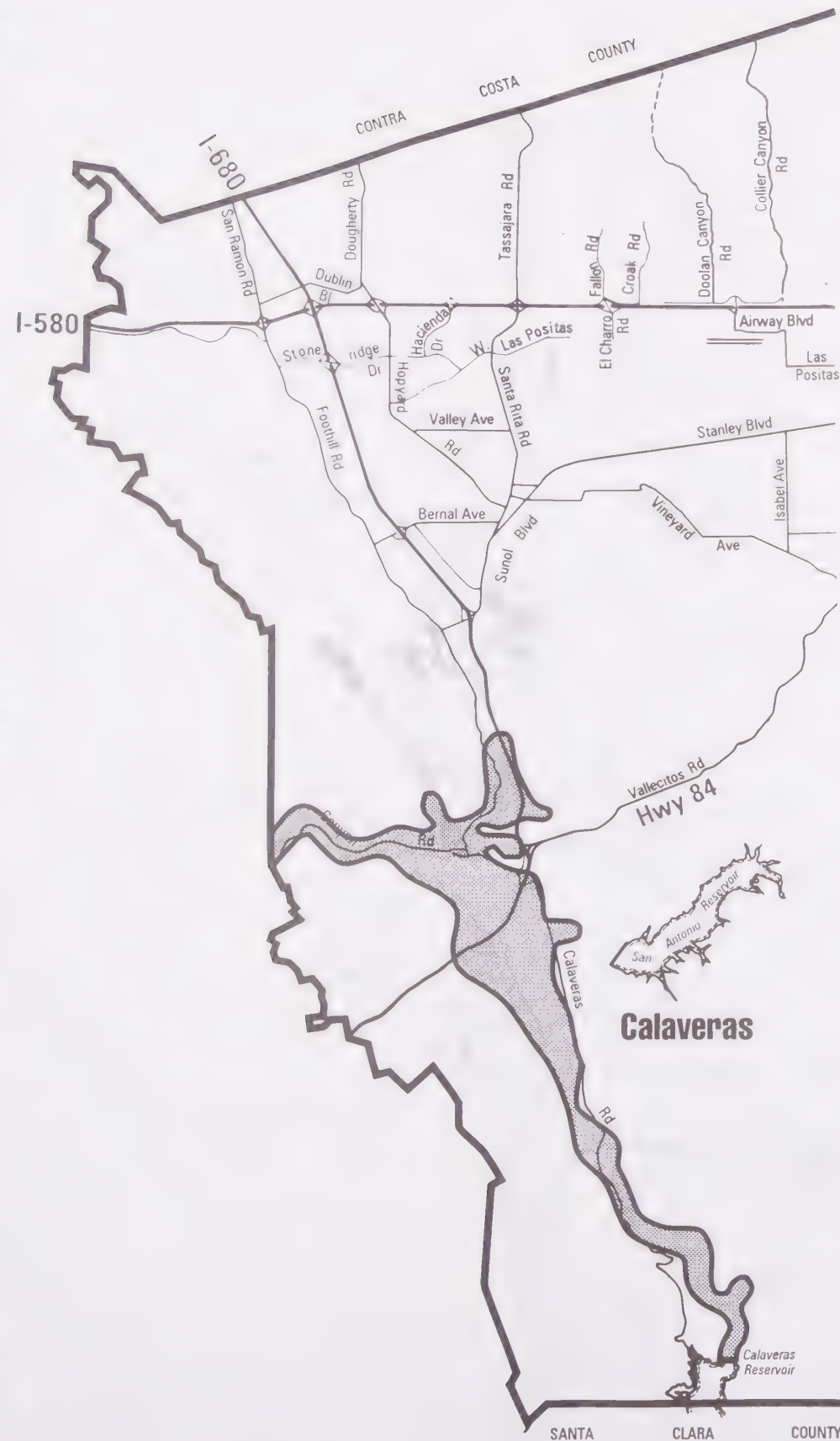


# Dam Inundation Zones: San Antonio & Calaveras Reservoirs

## LEGEND

 Dam Inundation Zones

**NOTE:** The inundation limits shown on this map are approximate, and include all potential flooded areas; they are based on topography and the assumption of severe dam failure.



SOURCE: Dam Failure and Evacuation Plan,  
Alameda County Office of Emergency Services, 1981

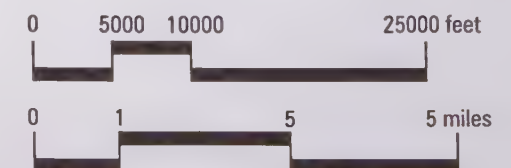


FIG. 49








# Flood Hazard Areas

## LEGEND

 FEMA Zone A Flood Hazard Areas & Zone 7 100 Year Flood Limits

 Watercourses

**NOTE:** This map is generalized from original source materials; hazard areas are approximate. For more specific information, refer to individual Zone 7 flood hazard maps. The term "watercourses" includes those which are fully improved, partially improved and unimproved.



SOURCE: Flood Hazard Areas 100 Year Flows, ACFCWCD  
Zone 7 Owned & Maintained Facilities, ACFCWCD  
Flood Insurance Rate Map, FEMA

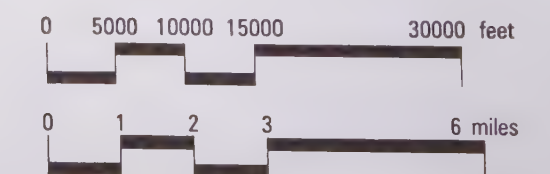


FIG. 50







### LEGEND

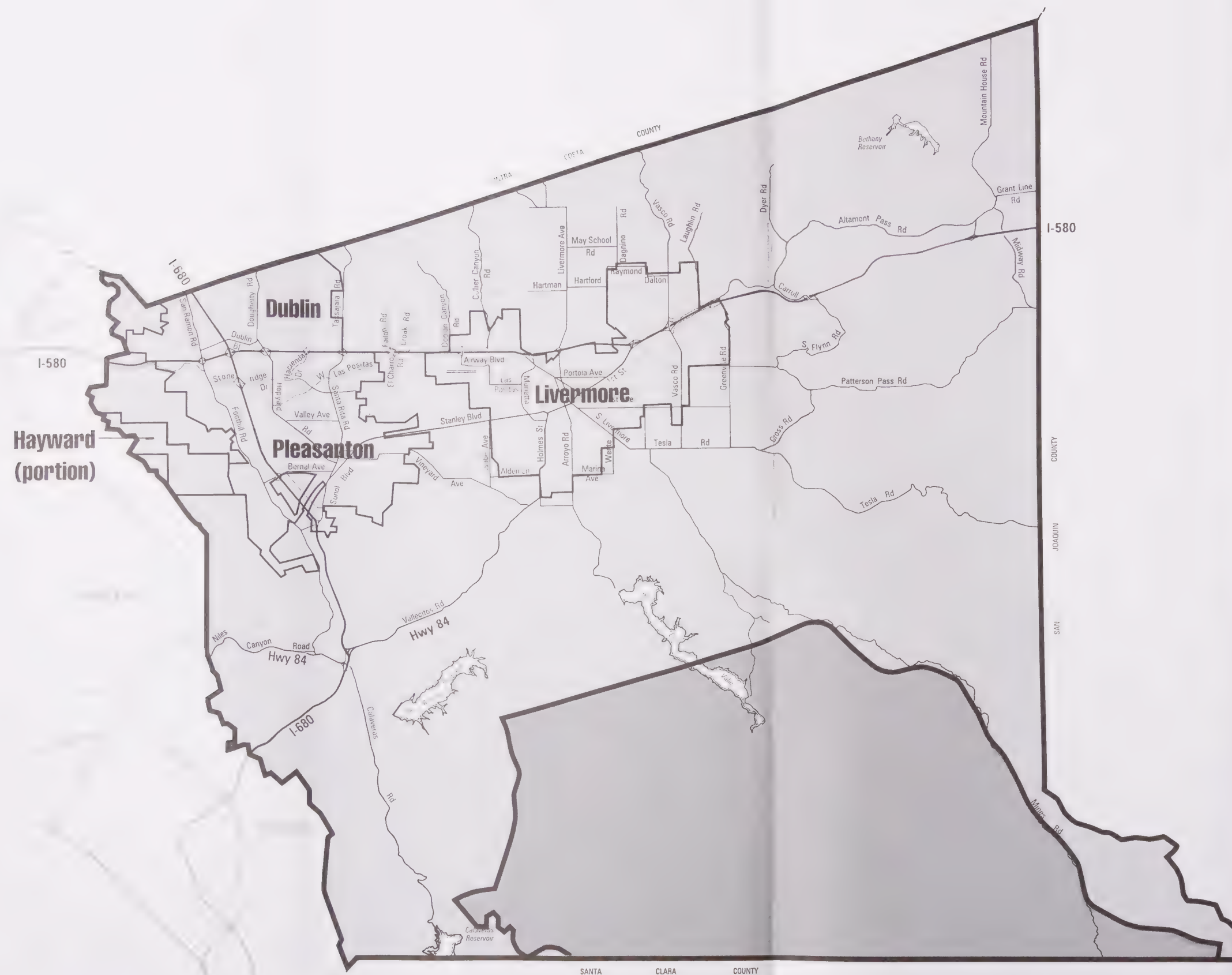
High Hazard Level

SOURCE: California Department of Forestry, 1986

0 1 2 3 6 miles



FIG. 51







# Generalized Land Slope Pattern

## LEGEND

- 0 - 2%
- 2 - 8%
- 8 - 15%
- 15 - 30%
- 30 - 50%
- 50% and over

NOTE: This map has been prepared to aid in general land use planning; it is neither intended, nor suitable, for evaluation of individual sites. The map is based on judgements that are interpretative and apply generally to large areas; within each area conditions may vary considerably.



SOURCE: U.S. Department of Agriculture

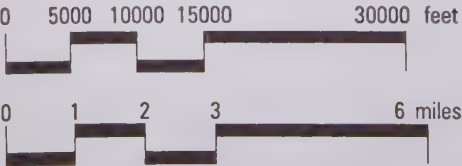


FIG. 52







# Relative Landslide Susceptibility Areas

## LEGEND

- Low
- Higher
- No Data Available

**NOTE:** For the purposes of this map, landslide hazards have been grouped into two categories: low landslide susceptibility and higher landslide susceptibility. Within the area of low susceptibility, landslides and other features related to slope instability are rare to non-existent. The area of higher susceptibility combines several separate categories--"marginally susceptible", "generally susceptible", and "most susceptible"-- which are defined in the text of the Geologic Hazards background report. This map has been prepared to aid in general land-use planning; it is neither intended, nor suitable, for evaluation of individual sites. The map is based on judgements that are interpretive and apply generally to large areas; within each area conditions may range, locally, through all levels of susceptibility.



SOURCE: Landslide Hazard Identification Map No. 21 & 27  
Relative Landslide Susceptibility Map Plate No. 21A2, 21A1,  
27A, U.S. Department of the Interior Geological Survey



FIG. 53





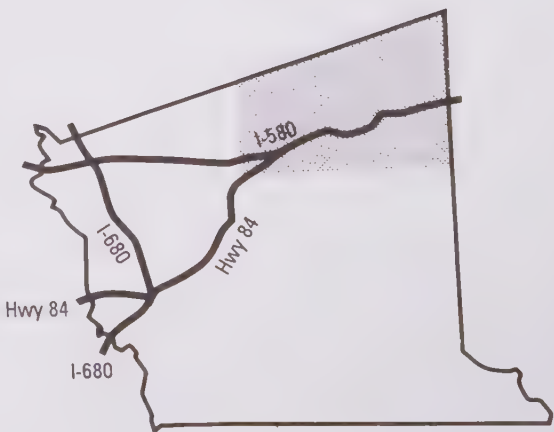


# Landslide Deposits A

## LEGEND

- Deposit approx. 200 - 500 feet in longest dimension
- Deposit larger than 500 feet in longest dimension

NOTE: This map has been prepared to aid in general land use planning; it is neither intended, nor suitable, for use as a tool in evaluating individual sites.



SOURCE: U.S. Department of the Interior Geological Survey, 1976

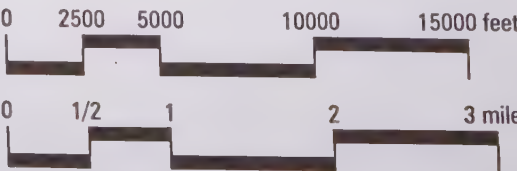


FIG. 54







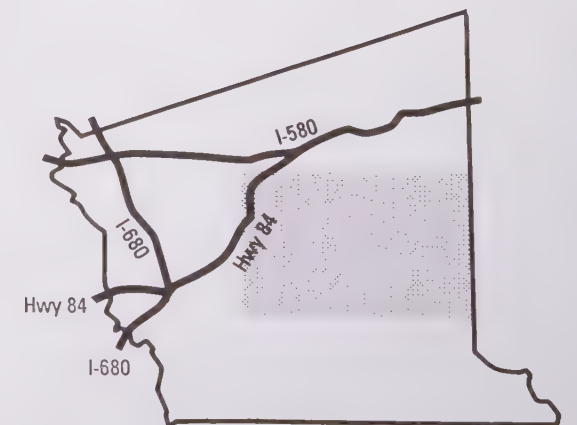
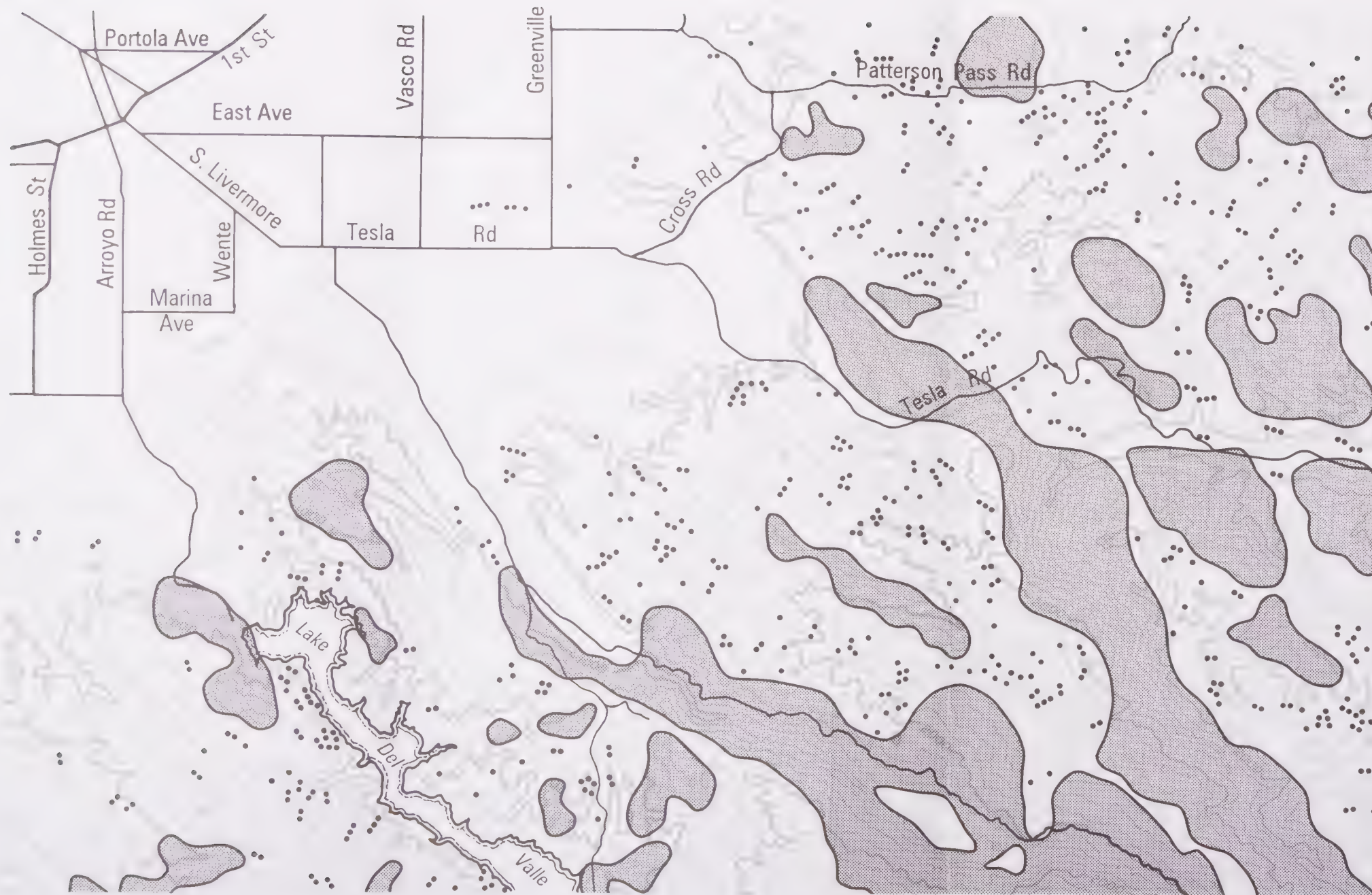


# Landslide Deposits B

## LEGEND

-  Deposit approx. 200 - 500 feet in longest dimension
-  Deposit larger than 500 feet in longest dimension

**NOTE:** This map has been prepared to aid in general land use planning; it is neither intended, nor suitable, for use as a tool in evaluating individual sites.



SOURCE: U.S. Department of the Interior Geological Survey, 1976

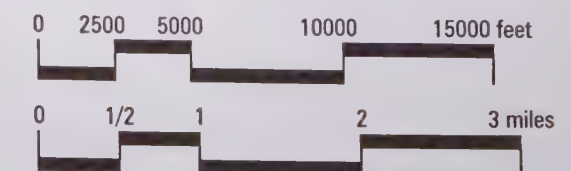




FIG. 55



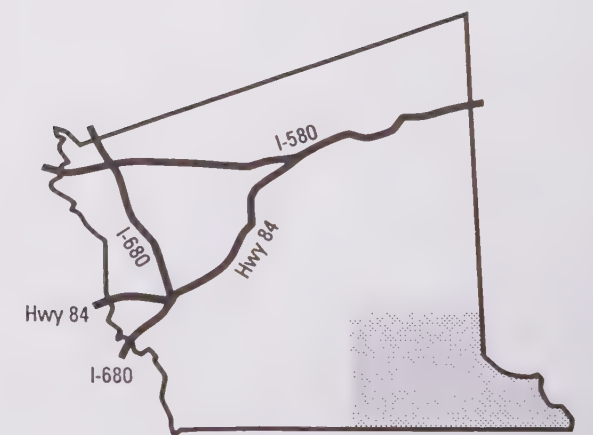
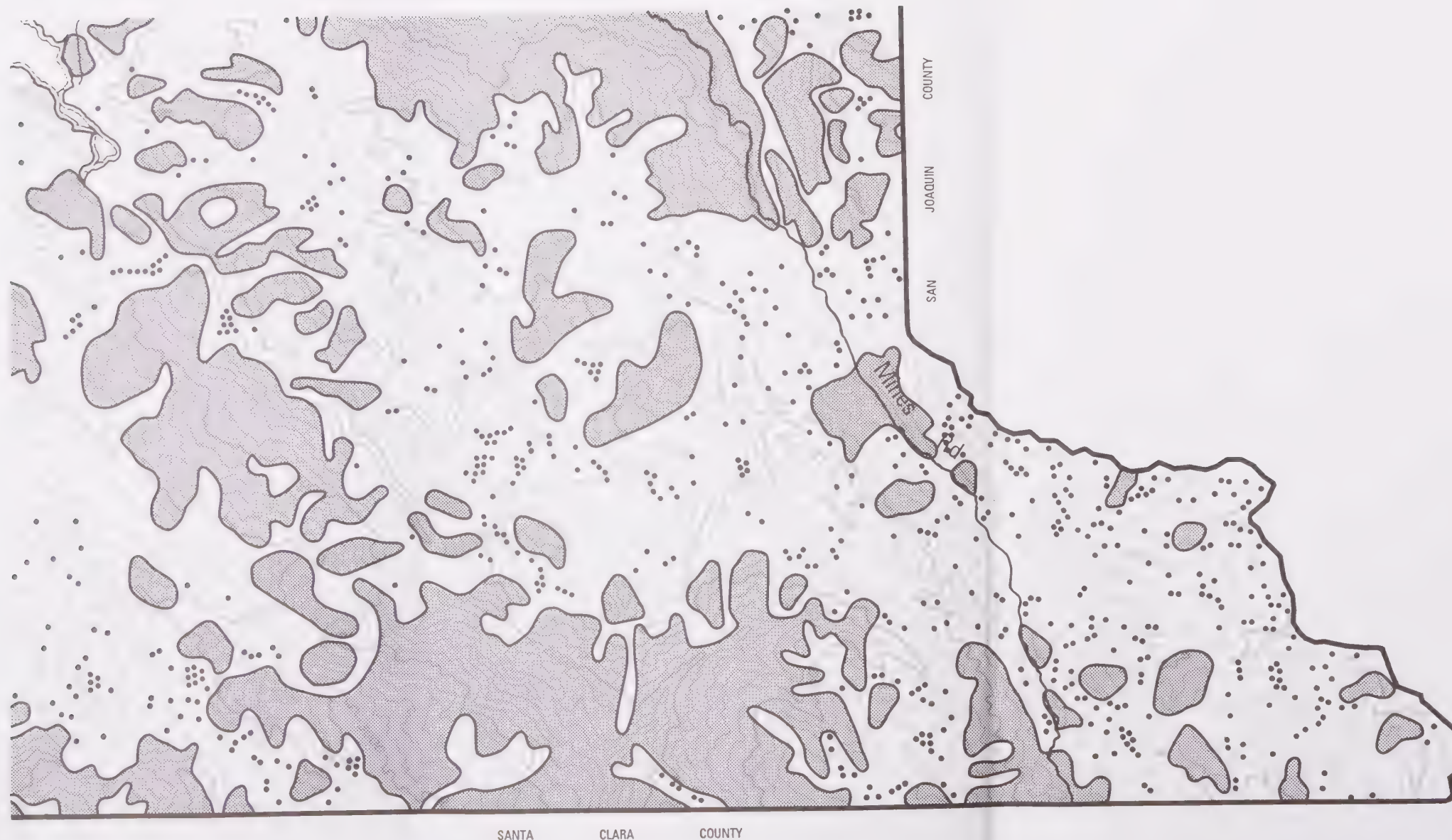


# Landslide Deposits C

## LEGEND

-  Deposit approx. 200 - 500 feet in longest dimension
-  Deposit larger than 500 feet in longest dimension

**NOTE:** This map has been prepared to aid in general land use planning; it is neither intended, nor suitable, for use as a tool in evaluating individual sites.



SOURCE: U.S. Department of the Interior Geological Survey, 1976

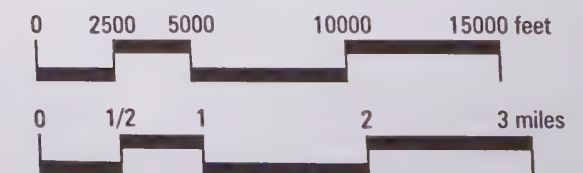


FIG. 56







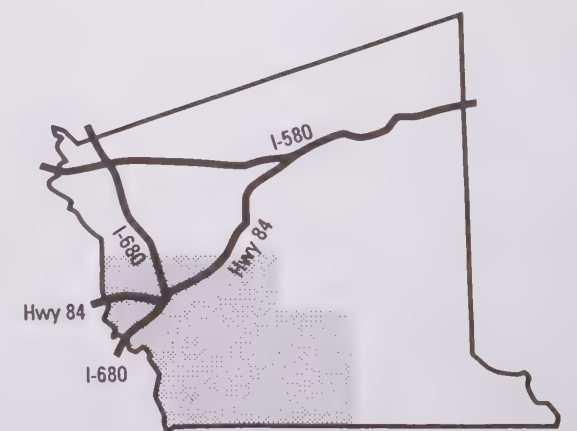


# Landslide Deposits D

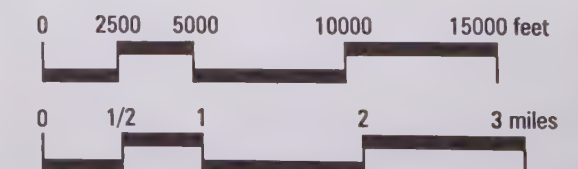
## LEGEND

-  Deposit approx. 200 - 500 feet in longest dimension
-  Deposit larger than 500 feet in longest dimension

**NOTE:** This map has been prepared to aid in general land use planning; it is neither intended, nor suitable, for use as a tool in evaluating individual sites.



SOURCE: U.S. Department of the Interior Geological Survey, 1976





**FIG. 57**



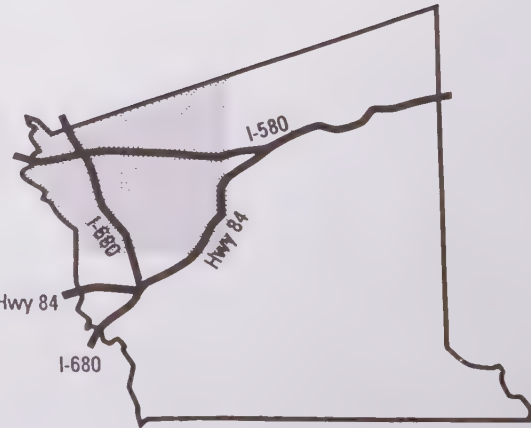


# Landslide Deposits E

## LEGEND

-  Deposit approx. 200 - 500 feet in longest dimension
-  Deposit larger than 500 feet in longest dimension

**NOTE:** This map has been prepared to aid in general land use planning; it is neither intended, nor suitable, for use as a tool in evaluating individual sites.



SOURCE: U.S. Department of the Interior Geological Survey, 1976

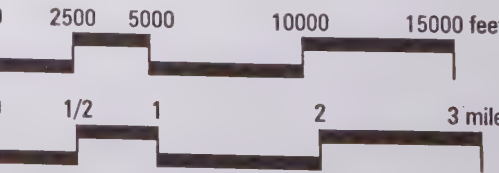


FIG. 58





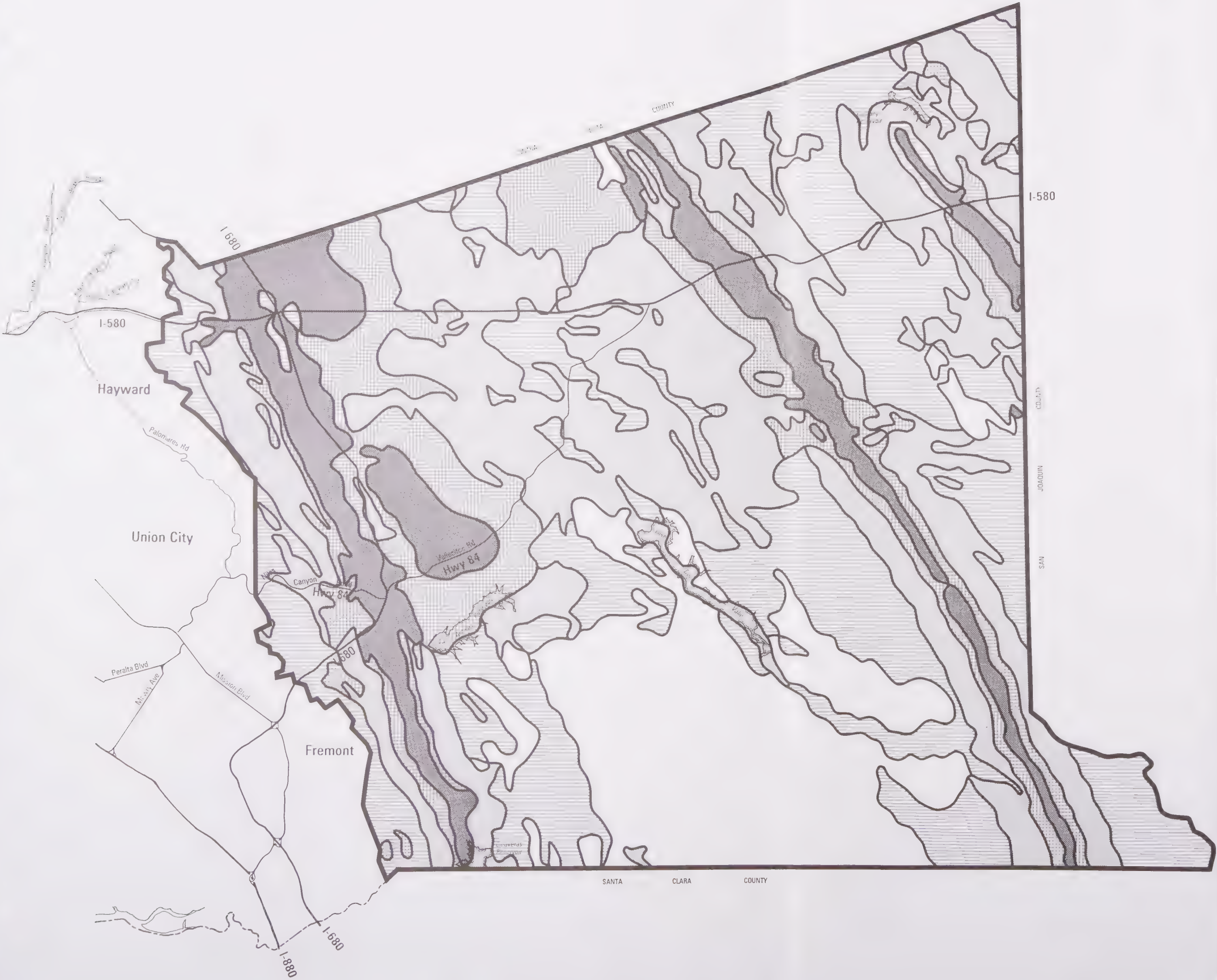


# Maximum Groundshaking Intensity

LEGEND

- Violent
- Very Strong
- Strong
- Weak
- Negligible

NOTE: "Maximum groundshaking intensity" is mapped here by creating a composite of expected severity maps for various Bay Area earthquake scenarios. A different scenario has been generated for an earthquake on each of the thirty known faults that may generate groundshaking in the Bay Area. For each site on the composite map, the worst case scenario--the highest intensity level occurring on any individual maps--has been plotted. For additional information on the assumptions and methodology used in preparing this map--and a listing of the expected earthquake magnitudes used in the individual scenarios--see the ABAG report *On Shaky Ground* (1987).



SOURCE: Association of Bay Area Governments, Oct. 1988

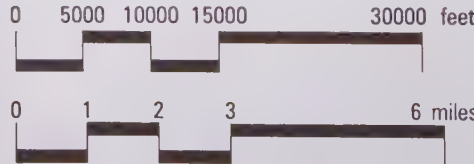


FIG. 59











## APPENDIX 1

### The Role of LAFCOs in California

#### ■ EARLY HISTORY

The end of World War II saw California experiencing a tremendous population increase, precipitating a rapid, haphazard formation of cities and special service districts. The consequences of this development boom became evident as more of the state's agricultural land was converted to urban uses. Premature, unplanned development often resulted in inefficient, expensive systems for the delivery of public services. Even worse were situations in which jurisdictions would incorporate or annex large, irregular portions of land, resulting in irrational urban boundaries and populations which received few, if any, services.

Governor Edmund G. Brown, Sr. responded to this problem in 1959 by appointing the Commission on Metropolitan Area Problems. The Commission's charge was to study and make recommendations on the "misuse of land resources" and the growing complexity of overlapping jurisdictions. The Commission's recommendations on local governmental reorganization were introduced in the Legislature in 1963, resulting in the creation of Local Agency Formation Commissions, or "LAFCOs", in every county except San Francisco.

#### ■ LEGAL AUTHORITY

LAFCOs were first established through the Knox-Nisbet Act of 1963. Complementing this legislation was the District Reorganization Act of 1965, which combined the separate laws governing special district boundaries into a single statute. The next significant legislation came in 1977 with the Municipal Organization Act, which served to consolidate the various laws on city incorporation and annexation procedures. These three laws contained many parallel and duplicative provisions, and a number of inconsistencies existed between them.

This situation made city and district boundary changes unnecessarily confusing and complicated. To remedy this situation, the Cortese-Knox Reorganization Act (Sections 56000 *et seq* of the Government Code) was enacted in 1985 to recodify the duties and powers of LAFCOs. While the law contained some minor procedural changes, its primary purpose was to consolidate earlier legislation, streamlining the process by removing redundancies and inconsistencies.

#### ■ PRIMARY LAFCO OBJECTIVES

LAFCOs were originally created with a mandate to accomplish two central objectives: 1) to encourage the orderly formation of local government agencies; and 2) to ensure that affected populations receive efficient, high-quality services. To accomplish this, the legislature gave them regulatory authority over local agency boundary changes. This mandate was eventually

broadened in the 1970s to respond to concerns over urban sprawl and loss of agricultural land/open space.

One consequence of this expanded role was that LAFCOs became increasingly focused on fostering orderly growth and development. They also adopted two fundamental policies regarding agricultural/open space resources: 1) to guide development for uses other than open space away from prime agricultural lands; and 2) to encourage development of vacant or non-prime agricultural lands within the jurisdiction/sphere of influence of a local agency before allowing development of open space outside of this area.

## ■ LAFCO RESPONSIBILITIES/POWERS

- o **Coordinating logical and timely changes in boundaries of local agencies.** LAFCOs regulate, through approval or denial, the boundary changes proposed by public agencies or individuals (a discussion of the different types of changes can be found below). LAFCOs do not have the power to initiate boundary changes.
- o **Determining "spheres of influence" for cities and special districts.** A sphere of influence is generally defined as the "probable ultimate physical boundary" of a local governmental agency. LAFCOs have been accorded this authority--which is described in greater depth below--since 1972.
- o **Conducting special studies regarding ways to reorganize, simplify and streamline governmental structure.** These studies provide general information about local governments and present alternatives for improving services and reducing operational costs. They often take the form of service studies or consolidation feasibility studies.

## ■ BOUNDARY CHANGES

Proposed boundary changes can take a number of different forms, the most common of which are the following: 1) annexations to, or detachments from, cities or districts; 2) formation or dissolution of districts; 3) incorporation or disincorporation of cities; 4) consolidation or reorganization of cities or districts; 5) establishment of subsidiary districts. As noted above, LAFCOs do not have the power to initiate boundary changes; they simply respond to proposals made by local agencies or individuals--either approving them, disapproving them, or approving them predicated on adherence to specified terms and conditions.

The legislature's authority over boundary changes has been repeatedly upheld by the courts, which have found that the state has the authority to "create, expand, diminish, or totally abolish municipal corporations with or without the consent of its citizens, or even against their protest" (see *Scuri v. Board of Supervisors*, 134 Cal. App. 3d). As such, boundary changes are not subject to referendum, even in charter cities. The state specifies numerous factors which must be considered by LAFCOs when reviewing a proposed boundary change, and they are noted in Section 56841 of the Government Code:



- o Population, population density; land area and land use; per capita assessed valuation; topography, natural boundaries, and drainage basins; proximity to other populated areas; the likelihood of significant growth in the area, and in adjacent incorporated and unincorporated areas, during the next 10 years.
- o The need for organized community services; the present cost and adequacy of governmental services and controls in the area; probable future needs for those services and controls; probable effect of the proposed incorporation, formation, annexation, or exclusion and or alternative courses of action on the cost and adequacy of services and controls in the area and adjacent areas.
- o The effect of the proposed action, and alternative actions, on adjacent areas, on mutual social and economic interest, and on the local governmental structure of the county.
- o The conformity of the proposal and its anticipated effects with both the adopted commission policies on providing planned, orderly, efficient patterns of urban development, and the policies and priorities set forth in Section 56377.
- o The effect of the proposal on maintaining the physical and economic integrity of agricultural lands.
- o The definiteness and certainty of the boundaries of the territory, the non-conformance of proposed boundaries with lines of assessment or ownership, the creation of islands or corridors of unincorporated territory, and other similar matters affecting the proposed boundaries. (A separate section provides that a LAFCO cannot disapprove a city's proposal to annex an island of unincorporated territory that comprises less than 75 acres).
- o The sphere of influence of any local agency which may be applicable to the proposal being reviewed. (A city cannot annex an area which lies outside its sphere of influence; it must first request, and obtain, an amendment to its sphere by the LAFCO).
- o Consistency with city or county general and specific plans.
- o The comments of any affected local agency.

#### ■ SPHERES OF INFLUENCE

A sphere of influence (SOI) consists of an unincorporated area adjacent to a city or special district, and is usually defined as the "probable ultimate physical boundaries and service area" of an agency. Establishment of this boundary is necessary to determine which governmental agencies can provide services in the most efficient way to the people and property in any given area. The SOI requirement also discourages urban sprawl by preventing overlapping of jurisdictions and duplication of services. LAFCOs are required to periodically review and

update adopted spheres of influence. They are also required to determine the SOI for a newly-incorporated city within one year of the incorporation date.

The state delineates a number of factors which are to be considered in determining the sphere of influence for a local agency:

- o Present and planned uses in the area, including agricultural and open space lands.
- o Present and probable need for public facilities in the area.
- o Present capacity of public facilities and the adequacy of public services which the agency provides or is authorized to provide.
- o The existence of any social or economic communities of interest in the area if the Commission determines that they are relevant to the agency.

#### ■ URBAN SERVICE AREAS

Some LAFCOs have taken the additional step of designating "urban service areas", which are defined under Section 56080 of the Government Code as: "developed, undeveloped, or agricultural land, within the sphere of influence of a city, which is served by urban facilities, utilities, and services, or which are proposed to be served by urban facilities, facilities, utilities, and services during the first five years of an adopted capital improvement program." Some counties, such as Marin, interpret this language very broadly. Marin's definition of an urban service area focuses on where urban development can best be accommodated over the next ten years (based on a city's ability to finance the expansion of public services and facilities).

The boundaries of urban service areas can be altered by a LAFCO in the same manner as an SOI change; however, a LAFCO cannot disapprove annexation of land it has accepted as part of a city's Urban Service Area. The criteria for determining these boundaries vary from county to county (to the extent they exist at all). Those of Marin, for example, focus primarily on the following factors: 1) the development potential and growth rate of the area; 2) the availability of vacant land to accommodate growth; 3) the availability and ability of existing services to accommodate growth; and 4) the discouragement of urban sprawl.

#### ■ PREZONING

A LAFCO may require that a city prezone the area within a proposed annexation (although it may not dictate the specific zoning to be applied). A city may also, of its own accord, choose to prezone unincorporated territory that it expects to annex at some future date. The proposed zones should be consistent with the city general plan, and a public hearing must be held just as with a conventional zoning proposal.



One advantage to rezoning is that it allows the city to have zoning in effect immediately upon annexation, and affords local residents prior knowledge of the land use regulations that would affect them should annexation occur. Rezoning also serves notice to the LAFCO of the city's intentions regarding its adjacent areas; a LAFCO may deny an annexation proposal if the rezoning is at odds with the "ultimate intended use" represented on the general plan.

## ■ ENVIRONMENTAL REVIEW

The applicability of CEQA to boundary changes and SOI amendments is supported both by case law and CEQA guidelines. All projects which fall under CEQA authority must have a designated "Lead Agency" which carries primary responsibility for supervising or approving the project as a whole. The Lead Agency will normally be one with broad governmental powers (such as a city or county) rather than one with more limited authority (such as a LAFCO). LAFCOs usually do not play the role of Lead Agency, although there are certain instances--such as those involving incorporations, formations and spheres of influence--in which a commission may be required to assume this role.

The usual role played by a LAFCO is that of a "Responsible Agency", which obliges it to consult with the Lead Agency in order to identify its concerns. It is the responsibility of the Lead Agency to prepare the actual environmental document, and to address the concerns raised by the Responsible Agencies. A Responsible Agency should participate in the information gathering process for this document, and must review and rely upon the final product prior to making its final recommendation on whether the project should be approved. While a Responsible Agency is required to consider impacts and mitigation measures identified in the Lead Agency's environmental document, it is only required to adopt those steps which are within its power to implement.

## ■ LAFCO's RELATIONSHIP TO CITY AND COUNTY GOVERNMENT

The composition of each LAFCO represents interests at both the city and county level. Most commissions (including the Alameda County LAFCO) are composed of two city council representatives (selected by a majority of the county's mayors); two county supervisors (selected by the Board of Supervisors); and one public member (selected by the four other members). LAFCOs are governed by local officials and operate independently of state control. However, they are not "county agencies" in any conventional sense of the term; their decisions are guided by state-mandated parameters, and they carry out a function of state government.

The exclusive nature of LAFCO authority over jurisdictional issues has broad implications. For example, a county cannot require an annexing city to comply with the county general plan. Similarly, while the state encourages consistency between LAFCO decisions and city/county general plans, state precepts govern whenever there is a conflict. However, it should be noted that LAFCO powers do not extend to planning per se; LAFCOs can indirectly influence local land use policy (using their authority over boundary changes and SOIs) but direct land use authority is vested in city and county governments.



## ■ IMPLEMENTATION OF LAFCO DECISIONS

LAFCO decisions are not self-implementing; once a LAFCO adopts a resolution approving a boundary change, the commission must forward a copy of the resolution to the "conducting authority", which is charged with carrying out a prescribed set of procedures. Each LAFCO resolution specifies which agency is to be designated as conducting authority (a function, primarily, of the type of boundary change addressed in the resolution). The conducting authority is not empowered to change the boundaries established by LAFCO in the resolution, although there are rare exceptions to this rule. The powers of a conducting authority vary depending on the nature of the agency and the proposed boundary change.

When acting as a conducting authority, a city council for a city in which a detachment is proposed has discretion to disapprove the detachment. For a proposed city detachment which is part of a reorganization proposal (i.e., two or more changes of organization) the conducting authority is not necessarily the city council of the affected city; when it is not the city council, the conducting authority must terminate the proposal if objection is received from the city. For an annexation to a district, the conducting authority is to consider a number of factors, and has discretion to disapprove the annexation or submit the proposal to an election; the conducting authority for an annexation to a city does not have such discretion.

When a conducting authority does not exercise its discretion to disapprove a proposal, or does not have the discretion to disapprove a proposal or submit it to an election, the conducting authority acts ministerially to count protests and carry out the prescribed procedures. These procedures vary according to the type of proposal. For example, with a proposal to annex uninhabited territory to a city or registered voter district, the conducting authority must do one of the following:

- 1) Terminate the proposal (if protests are filed by landowners owning 50 percent or more of the assessed value of land in the territory to be annexed); or
- 2) Order the annexation.

The procedures for an annexation of inhabited territory are more complex, with three possible options for the conducting authority:

- 1) Terminate the proposal (if protests have been filed by 50% or more of the registered voters residing in the territory to be annexed); or
- 2) Order the annexation subject to confirmation by a majority of those voting in the territory to be annexed (if protests are received by more than 25 percent of the landowners, or between 25 and 50 percent of registered voters residing in the territory); or
- 3) Order the annexation without an election (if the protests are insufficient to satisfy either of the first two criteria).

It should be noted that there are several exceptions to option #2 above, and that the threshold figure for landowners (25 percent) is only applicable if they also own at least 25 percent of the assessed value of land in the territory to be annexed. Ministerial procedures for other, less common, types of boundary changes are found in the California Government Code.

#### ■ SPECIAL ISSUES

- o **Applicability of a county's prior land-use decisions to a newly-incorporated city.** State regulations in this area vary depending on the nature of the decision. In some cases, the county's earlier determination remains in force; in others, it does not.
- o **Incorporated areas which extend beyond a city's sphere of influence.** Hayward's "East Hills Annex" is an example of such a situation. The debate centers on whether a city's "probable ultimate physical boundary and service area" can be construed to include an area which lies within the existing corporate limits of another city (based on physical/practical issues such as contiguity and ability to service an area). Once a city is allowed to absorb an area within its corporate limits, a LAFCO does not have the authority to order its de-annexation, regardless of where the city's SOI lies.
- o **Effectiveness of SOIs as tools for agricultural/open space preservation.** Cities' long-range plans often include provisions for maintaining non-urbanized land to serve as a buffer between the city's urban area and neighboring jurisdictions; whether a city can achieve this goal by including non-urbanized land in its SOI is unclear. Sections 56377(b) and 56841 of the Government Code define a sphere of influence as the primary area within which "urban development" is to be encouraged; this suggests that SOI designation is not intended to be used as a means for preserving open space. However, the Code does not explicitly state that SOI designation connotes urbanization.

## **SOURCES**

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Detweller, Peter M., Local Agency Formation Commissions and Other Local Planning Agencies, 1990.

Governor's Office of Planning and Research, LAFCOs, General Plans, and City Annexations, 1986 (revised 1990).

Sacramento County LAFCO, Policies, Standards and Procedures for LAFCO, 1990.



## APPENDIX 2

### Techniques for Growth Management

#### ■ INTRODUCTION

A variety of techniques have been used by local governments to manage growth within their jurisdictions. How well a particular technique works in a given community depends on how well the technique is suited to the circumstances within the jurisdiction and how well the program is designed and implemented. The decision of which techniques would be most effective in a particular jurisdiction should be based on what the jurisdiction wants to accomplish through growth management and the market forces in the area.

Determining holding capacities can be a useful tool in setting goals for a growth management program. Holding capacities represent the ultimate population, number of housing units, or number of jobs that the land available for development would be able to support. Holding capacities for each type of land use that is expected to occur within an area can serve as targets that can be used to determine the amount and distribution of development to create a balance between land uses and to plan for infrastructure and services.

#### ■ TYPES OF GROWTH MANAGEMENT TECHNIQUES

Many local governments have incorporated a combination of techniques into their growth management programs to address growth issues facing the jurisdictions.

Five major categories of growth management techniques are described below:

1. Some techniques control the **timing of development** by limiting the amount of development that can take place during a given time period. Limits may be placed on the number of residential building permits issued, commercial or industrial square footage, or the amount of population growth that is permitted within a certain time period.

Both Livermore and Pleasanton have growth management programs which limit the number of residential building permits that can be issued each year. Livermore's growth management plan, which was adopted in 1976 and revised in 1987, limits the average residential growth rate to between 1.5 and 3.5 percent of the city's population for a given calendar year. The population cap is based on a three-year housing plan which takes into consideration infrastructure requirements and need for services resulting from proposed growth, environmental impacts and constraints, and current job growth in the city.

Pleasanton's growth management program, adopted in 1978, limits residential allocations to between 260 and 650 housing units per year. The annual allocation is based on an annual growth management report which includes a periodic assessment of housing need,

employment growth, the availability of infrastructure and the city's ability to provide public services. Exemptions are granted above the annual growth allocations for certain projects, such as single family homes on an existing lot, and projects which meet certain policies, such as the provision of low-income housing.

2. Growth management techniques can also control the total **amount of land that is available for development** or the amount of land that is available for certain types of development to change the mix of land uses within a jurisdiction. Residential land can be rezoned to less intensive uses, such as open space or agriculture, and commercial and industrial land can be rezoned for residential uses.

Another example of this type of technique is the Urban Limit Line. In her paper, *Drawing the Line: Establishing and Implementing an Urban Limit Line in Alameda County* (May 1991), Ann Rendahl, a graduate student at U.C. Berkeley, defines an urban limit line as:

A boundary surrounding an urban area that designates where the urban area stops and open space, used for agriculture, or recreation or other activities consistent with open space, begins. The establishment of the boundary effectively creates a greenbelt of open space land outside of the urban area. The boundary is established in such a manner that enough development can occur within the boundary to accommodate expected population increases.

Urban limit lines or similar policies have been established in many California jurisdictions, as well as jurisdictions in Oregon, the city of Boulder, Colorado; and elsewhere. The function of the urban limit line and the criteria for establishing it vary from jurisdiction to jurisdiction.

Urban limit lines may be permanent or temporary. A permanent urban limit line would be more effective in preserving open space, agricultural and environmentally sensitive land over an extended period of time by fixing the boundary to which the urban area could ultimately expand. However, a permanent line may limit the County's ability to adapt to unforeseen changes in population growth rates in the future.

A temporary urban limit line, which could be amended periodically to expand the area available for development, would not be as effective in ensuring that open space, agricultural and environmentally sensitive land would be permanently preserved. However, a temporary line could allow greater flexibility in adapting to changes in growth patterns and would allow for the phasing of development to promote more orderly growth. Several jurisdictions have implemented multiple urban limit lines where there are both permanent and temporary boundaries.

3. Zoning can also be used to limit the **amount of development allowed on available land**. Through traditional zoning techniques, a jurisdiction may place restrictions such as density and building coverage or intensity limits on land within particular zones.

4. **Infrastructure requirements** require adequate service levels or service capacity prior to or as a condition of development approval. These requirements may be applied to residential, commercial, or industrial development.
5. Greater **political control** over decisions affecting growth management can be obtained through measures requiring a special approval process for land use decisions involving increased densities. Such measures include voter approval or approval by a greater than simple majority of the governing board of the local jurisdiction for general plan or zoning amendments which allow increased residential densities.





## APPENDIX 3

### Sub-Regional Agencies in the Planning Area

#### ■ ALAMEDA COUNTY CONGESTION MANAGEMENT AGENCY

The Alameda County Congestion Management Agency (CMA) was created in 1991 by a Joint Powers Agreement; the Alameda County Transportation Advisory Committee, which serves under CMA and provides guidance on technical issues, was created at the same time. The voting composition of the CMA board is as follows: two voting representatives from the Alameda County Board of Supervisors; one voting representative from each of the transit operators (BART, AC Transit, Livermore Amador Valley Transit and Union City Transit); one vote per 100,000 residents (or fraction thereof) for each Alameda County city; and one non-voting representative each from the California Department of Transportation (District 4), Metropolitan Transportation Commission, and Bay Area Air Quality Management District.

CMA is the successor to the Alameda County Transportation Plan Commission, and has assumed all of its powers and duties. As such, CMA coordinates transportation planning and programming throughout Alameda County, as well as with contiguous counties. CMA is also responsible for coordinating countywide input relating to various state and regional transportation programs. CMA seeks state and federal funding to offset costs associated with the CMP and other agency responsibilities; it also administers the Combined Road Program for the County (along with other, comparable, federal funding programs).

CMA is responsible for both the Countywide Transportation Plan and the County's Congestion Management Program (CMP). The CMP encourages federal, state and local agencies to join with private and environmental interests to establish comprehensive congestion management strategies. Its primary responsibilities include: creating a performance review process, through monitoring of transportation facilities and designation of service standards; promoting alternatives to single-occupancy auto use; implementing and updating a seven-year investment strategy (the Capital Improvement Program); and encouraging an integrated approach to decisions relating to land development, transportation investment and air quality.

#### ■ ALAMEDA COUNTY TRANSPORTATION AUTHORITY

The Alameda County Transportation Authority (ACTA) was created by Measure B in 1986 to administer funds generated by a new 1/2 cent sales tax. The tax is allocated to County transportation needs, with funds going to cities for roadwork, and to authorities such as AC Transit and Alameda Paratransit. Although Measure B included provisions for BART extensions within Alameda County, a dispute between BART and ACTA has thus far prevented the transfer of any funds to BART.

#### ■ ALAMEDA COUNTY WASTE MANAGEMENT AUTHORITY

The Alameda County Waste Management Authority (ACWMA) is a countywide joint powers authority responsible for solid and hazardous waste planning. The Authority consists of seventeen members: one representing each of the County's fourteen cities, one representing the Board of Supervisors, and one representing each of two sanitary districts. County policy dictates that it maintain 50 years of sanitary landfill capacity within the County, and the Waste Management Authority is responsible for ensuring adherence to this policy. The Authority is also charged with the preparation, implementation and administration of the County's Integrated Waste Management Plan, and the Hazardous Waste Management Plan.

#### ■ ASSOCIATION OF BAY AREA GOVERNMENTS

The Association of Bay Area Governments (ABAG) was formed in 1961 by local elected officials of the Bay Area; today it includes more than 100 member cities, and all nine Bay Area counties (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano and Sonoma). ABAG acts as both a planning and services agency. Its planning functions are generally area-wide in scope, and include the following: offering technical planning assistance; forecasting population, housing and employment trends; and providing a regional forum for planning issues. ABAG's services include: providing economic/demographic information; financing local government projects; and providing liability insurance.

#### ■ BAY AREA AIR QUALITY MANAGEMENT DISTRICT

The Bay Area Air Quality Management District (BAAQMD) has jurisdiction over the nine counties found in the San Francisco Bay Air Basin (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, and the southern portions of Solano and Sonoma). BAAQMD's regulatory authority is limited to the policing of non-vehicular air pollution sources (which stem primarily from industrial uses and burning); while the agency has no direct regulatory authority over auto emissions, it can, and does, make policy recommendations in this area. BAAQMD jointly shares responsibility for maintenance of state and federal air quality standards with ABAG and the Metropolitan Transportation Commission.

#### ■ METROPOLITAN TRANSPORTATION COMMISSION

The Metropolitan Transportation Commission (MTC) was created by the California legislature in 1970. The region it serves encompasses the nine counties of the Bay Area (see list under ABAG). MTC's primary function is to prepare the Regional Transportation Plan for the Bay Area. Other MTC duties include: approving transportation projects which receive state and federal funding; allocating funds for transit operations; promoting and setting guidelines for transit systems coordination; evaluating the performance of transportation systems; and serving as an advocate for adequate transportation funding.



### ■ TRI-VALLEY TRANSPORTATION COUNCIL

The Tri-Valley Transportation Council was created to address transportation issues in the Tri-Valley area of Alameda and Contra Costa Counties. The Council is a joint powers authority comprised of the two counties, the town of Danville, and the cities of Livermore, Pleasanton, Dublin, and San Ramon. The primary goal of the Council is to provide a "blueprint for transportation investments" in the Tri-Valley, and to establish an official Tri-Valley position on relevant transportation projects at the county, regional or state level. The Council is currently working on a transportation plan for the region which would integrate and coordinate the various transportation planning efforts of cities and counties in the Tri-Valley.

### ■ TRI-VALLEY WASTEWATER AUTHORITY

The Tri-Valley Wastewater Authority is a joint powers authority representing Alameda County, the cities of Pleasanton and Livermore, and the Dublin San Ramon Services District. The Authority was formed in 1986 to plan and build a new system to treat and carry wastewater in excess of present pipeline capacity. In conjunction with this responsibility, the Authority has prepared a long-range Wastewater Management Plan.

### ■ ECONOMIC DEVELOPMENT ADVISORY BOARD

The Alameda County Economic Development Advisory Board (EDAB) was established by the Alameda County Board of Supervisors, the Alameda County Mayors Conference and independent Special District Associations. The purpose of the Board is to enhance the economic position of the County while maintaining its environment and quality of life. The Board's specific responsibilities include the promotion of inter-jurisdictional coordination on land use issues, and the preparation and evaluation of growth-management proposals.



## APPENDIX 4

### Methodology: Population, Jobs, Housing

#### ■ EXPLANATION OF DEMOGRAPHIC DATA SOURCES

Formulation of the *East County Area Plan* required demographic data for East County and the Tri-Valley subregion capable of reflecting, first, existing demographic conditions; second, projected growth to the 2010 time horizon; and, last, a composite view of city plans for future development. This latter composite view was structured into a development scenario termed the "Prospective General Plans" which is a combination of buildout of the three cities' adopted general plans, plus proposed general plan amendments, plus buildout of unincorporated land under the existing Livermore-Amador Valley Planning Unit General Plan (1977). A similar scenario was prepared for the Tri-Valley subregion. The "Prospective General Plans" scenario describes the shape and extent of growth as currently planned in the planning area and subregion and thus is useful as a basis of comparison with the *East County Area Plan*.

The County relied on two sources of demographic data--the Association of Bay Area Governments (ABAG) and Economic and Planning Systems (EPS). ABAG Projections 92, which is projected at geographic levels no smaller than city spheres of influence, was used at the regional and county level for the years 1990 and 2010 to establish the regional context of the *East County Area Plan*. In cases where demographic projections were needed by subarea, the County used data developed by EPS. These subareas include Eastern and West Dublin, North and South Livermore, Pleasanton Ridge, Tassajara and Dougherty Valleys. Subareas are defined by Tri-Valley Traffic Zones developed for the Tri-Valley Transportation model (see Figure 11) and may not conform to city general plan and general plan amendment boundaries. EPS used county and sphere of influence control totals established in ABAG's Revised Projections 90 (the only data available at the time the EPS projections were developed), disaggregating them to the subarea level. This process resulted in minor variations at the subregional (Tri-Valley) level between EPS and ABAG data. A comparison of EPS and ABAG control totals for 1990 and 2010 is shown in Tables G-1 and G-2.

Much of the data used in the "Prospective General Plans" scenario was already developed by EPS in previous work done for the Tri-Valley Wastewater Authority (see Long-Range Wastewater Management Plan for the Livermore-Amador Valley Draft Subsequent EIR, January 31, 1992) and for the Contra Costa Transportation Authority's (CCTA) land use data base for the Tri-Valley area.

#### ■ THE TRI-VALLEY JOBS/HOUSING STUDY

EPS developed jobs/housing data by subarea as apart of the "Prospective General Plans" scenario for the Tri-Valley subregion. Table G-3 projects housing need based on potential employment, and Table G-4 projects housing need by income category. This data reveals a significant



"affordability gap" in housing for workers of low to moderate incomes. The number of housing units needed within the income categories was determined by projecting potential employment by sector (e.g., agriculture, manufacturing, retail, service, etc.) and by occupation (e.g., professional sales, clerical, service, etc.) and applying average annual salaries to each component. Table G-5 provides data relating rent or the cost of a new home to income; Table G-6 defines the household income category (i.e., very low, low, median, moderate, and above moderate) by income range.

## ■ COMMUTE CONSTRAINT METHODOLOGY

The freeways running through the Tri-Valley (I-680 running north-south and I-580 running east-west) form four principal "gateways" into the Tri-Valley. These major routes are supplemented by smaller routes such as Vasco Road, Crow Canyon Road and Niles Canyon Road/Highway 84, which provide additional capacity to the gateways.

As shown in Table G-7, these various routes have been aggregated into four gateways, and the capacity available to serve commuters into the Tri-Valley has been estimated. Vasco Road has been combined with I-580 to define the East/Northeast gateway because both routes serve more affordable housing markets than the other three gateways. Planned rail transit capacity (BART) has also been incorporated into the analysis.

The future trip capacity estimates, provided by TJKM Transportation Consultants, reflect all feasible roadway improvements (i.e., improvements which are shown in cities' General Plans but which may or may not have committed funding, programmed improvements shown in regional and state improvement plans, and all other improvements which can feasibly be made to the roadway network to maximize the capacity); therefore, the estimates represent the maximum capacity of the transportation system once all roadway improvements are in place. This capacity has been expressed in terms of vehicles and workers during a three hour commute peak.

The percentage of A.M. peak trips which pass through the Tri-Valley to other destinations (i.e., trips for which neither the origin nor the destination is in the Tri-Valley) has also been estimated. For this analysis, it was assumed that the percentage of trips passing through the Tri-Valley in the future remains the same as it is now, i.e., per Metropolitan Transportation Commission (MTC) pass-through factors estimated in 1989. As shown in Table G-7, a relatively high proportion (55 percent) of commute trips coming from the east via I-580 in the A.M. peak period pass through to other destinations. This pattern has been verified by residential market studies in Modesto and other Central Valley communities.

Table G-7 estimates the number of workers that will commute into the Tri-Valley given employment and housing capacities under the "Prospective General Plans" scenario, and the proportion of employed residents likely to work in the Tri-Valley. In 1980, about 50 percent of employed Tri-Valley residents worked in the Tri-Valley. It is assumed that in the future, as local employment opportunities become more abundant, the percentage of employed residents will increase to 60 percent.

Table G-8 compares the demand under the "Prospective General Plans" scenario for workers coming into the East County who live outside the planning area with the capability of the transportation system to accommodate in-commuting to the Tri-Valley. In-commute demand has been distributed to the respective gateways based on a consideration of the affordability gap identified in Table G-4.

Because of the deficit of housing affordable to households on the lower end of the income distribution of the employment base, it was assumed that a disproportionate share of in-commuters will reside in the more affordable communities to the east and northeast of the Tri-Valley; that is, in the Central Valley, accessible to I-580, and in Antioch/Pittsburg, accessible via Vasco Road. As shown in Table G-7, the capacity of I-580 east and Vasco Road (28,500 vehicles) represents about 34 percent of the capacity of all four gateways combined (84,000 vehicles). In recognition of the affordability gap, EPS allocated 40 percent of in-commute demand to this east/northeast gateway.

As Table G-9 illustrates, under the "Prospective General Plans" scenario, in-commute capacity presents a major constraint to the realization of employment potentials, equivalent to nearly 40,000 jobs. This projected unrealized potential is equivalent to a resident workforce of approximately 26,500 households.

In summary, the following commute-constraint variables were analyzed:

- . the number of jobs and housing units within the Tri-Valley;
- . the affordability of Tri-Valley housing;
- . the number of Tri-Valley households employed outside the Tri-Valley, and thus not available to fill Tri-Valley jobs;
- . the availability and affordability of housing in areas within commute distance of Tri-Valley jobs; and,
- . the highway and transit capacities to serve commuters coming into the Tri-Valley.

#### ■ FORMULATION OF THE EAST COUNTY AREA PLAN HOLDING CAPACITIES

The *East County Area Plan* uses holding capacities for two time horizons - the year 2010 and buildout (see Tables 4 and 5 in Part IV. Plan Tables). The 2010 holding capacity for the *East County Area Plan* reflects ABAG's growth projections for East County (based on ABAG Projections '92). All cities in the planning area and Tri-Valley subregion have agreed upon the projections as the common holding capacity for the Tri-Valley and the basis of the traffic model being developed by the Tri-Valley Transportation Council.

The buildout holding capacity for the *East County Area Plan* has just about the same population and housing as the "Prospective General Plans" scenario but scales back employment potential in response to two objectives: (1) to realistically address the in-commute constraint on the transportation gateways leading into East County which requires a reduction of employment generating land uses, and (2) the desire to achieve a jobs/housing balance (which requires a further reduction of jobs).



TABLE G-1

**Comparison of EPS and ABAG Projections for Households  
and Employment - 1990**

Area	EPS Projections - 1990		ABAG Projections - 1990	
	Households	Employment	Households	Employment
East County Portion of Tri-Valley	47,696	76,231	48,449	70,399
Contra Costa County Portion of Tri-Valley	30,857	35,418	31,329	37,454
Total Tri-Valley	78,553	111,649	79,778	107,853

TABLE G-2

**Comparison of EPS and ABAG Projections for Households  
and Employment - 2010**

Area	EPS Projections -2010		ABAG Projections - 2010	
	Households	Employment	Households	Employment
East County Portion of Tri-Valley	92,068	147,962	91,898	140,495
Contra Costa County Portion of Tri-Valley	47,584	54,924	47,408	62,398
Total Tri-Valley	139,652	202,886	139,306	202,893

**Source:** Economic and Planning Systems, CCTA Projections based on ABAG Revised Projections 90 (revised 1992)



TABLE G-3

### Housing Need and Capacity: Buildout of the "Prospective General Plans" Scenario in the Tri-Valley Subregion

Tri-Valley Subareas	Potential Employment <sup>1</sup>	Housing Need <sup>2</sup>	Housing Capacity <sup>3</sup>	Surplus/(Deficit) of Housing	Capacity as % of Need
<b>Contra Costa County</b>					
Danville	7,705	4,873	13,223	8,350	271%
San Ramon	45,308	28,654	15,880	(12,774)	55%
Dougherty Valley	1,500	949	9,601	8,652	1012%
Alamo/Blackhawk	1,622	1,026	8,466	7,440	825%
Tassajara Valley	12	8	4,344	4,336	57240%
Other Uninc. CCC	99	63	308	245	492%
<b>Contra Costa County Subtotal</b>	<b>56,246</b>	<b>35,573</b>	<b>51,822</b>	<b>16,249</b>	<b>146%</b>
<b>Alameda County</b>					
Dublin	12,759	8,069	6,358	(1,711)	79%
East Dublin	25,716	16,264	17,550	1,288	108%
West Dublin	292	185	3,945	3,760	2136%
Livermore	101,545	64,219	25,881	(38,338)	40%
South Livermore	4,055	2,565	2,679	114	104%
North Livermore	13,791	8,722	15,705	6,983	180%
Pleasanton	64,566	40,833	28,552	(12,281)	70%
Pleasanton Ridge	50	32	2,509	2,477	7935%
Other Uninc. AC	200	126	257	131	203%
<b>Alameda County Subtotal</b>	<b>222,974</b>	<b>141,015</b>	<b>103,436</b>	<b>(37,577)</b>	<b>73%</b>
<b>Total Tri-Valley</b>	<b>279,220</b>	<b>176,588</b>	<b>155,258</b>	<b>(21,328)</b>	<b>88%</b>

Notes: <sup>1</sup> Buildout projections were derived from, or developed using:

Contra Costa County Subareas: CCTA Land Use System Preliminary Draft Projections, February 1992.

Alameda County Subareas:

Dublin: Dublin General Plan, February, 1985.

East Dublin: Draft East Dublin General Plan Amendment, February 1992.

West Dublin: West Dublin Specific Plan EIR, January 1992.

Livermore: Livermore General Plan as amended to November 14, 1988.

South Livermore: South Livermore Valley Area Plan, February 1992.

North Livermore: North Livermore GP Amendment DEIR, 45,000 Population Alternative, January 1992.

Pleasanton: Pleasanton General Plan as amended to 1992.

Pleasanton Ridge: Pleasanton Ridgeland Plan, January 1992.

Remainder Uninc.: Livermore/Amador Valley General Plan, 1989

<sup>2</sup> Housing need calculated for Tri-Valley workers assuming 1.58 workers per occupied household.

<sup>3</sup> Capacity in terms of occupied dwelling units assuming 0.05 vacancy rate for dwelling units at buildout.

Sources: CCTA Land Use Information System; General Plans of Tri-Valley Cities; Chandler W. Lee, AICP; Economic and Planning Systems, Inc.

TABLE G-4

**Housing Need by Income Category:  
Buildout of the "Prospective General Plans" Scenario  
in the Tri-Valley Subregion**

Subarea and Income Category <sup>1</sup>	Housing Need <sup>2</sup>	Housing Capacity <sup>3</sup>	Surplus (Deficit) of Housing <sup>4</sup>	Capacity as % of Need
<b>Contra Costa County Portion:</b>				
\$0 to \$15,099	4,328	153	(4,175)	4 %
\$15,100 to \$28,399	6,900	1,367	(5,533)	20 %
\$28,400 to \$47,299	10,531	7,843	(2,688)	74 %
\$47,300 to \$66,199	6,522	5,197	(1,325)	80 %
\$66,200 to \$94,599	4,693	17,897	13,205	381 %
\$94,600 and +	2,597	19,365	16,768	746 %
<b>CC Subtotal</b>	<b>35,571</b>	<b>51,822</b>	<b>16,252</b>	<b>146 %</b>
<b>Alameda County Portion:</b>				
\$0 to \$15,099	15,680	1,142	(14,539)	7 %
\$15,100 to \$28,399	25,308	7,638	(17,670)	30 %
\$28,400 to \$47,299	41,699	32,204	(9,496)	77 %
\$47,300 to \$66,199	27,595	19,234	(8,361)	70 %
\$66,200 to \$94,599	20,458	23,332	2,874	114 %
\$94,600 and +	10,275	19,887	9,612	194 %
<b>AC Subtotal</b>	<b>141,015</b>	<b>103,437</b>	<b>(37,580)</b>	<b>73 %</b>
<b>Total By Income Category</b>				
\$0 to \$15,099	20,009	1,295	(18,714)	6 %
\$15,100 to \$28,399	32,208	9,004	(23,203)	28 %
\$28,400 to \$47,299	52,231	40,047	(12,184)	77 %
\$47,300 to \$66,199	34,117	24,431	(9,686)	72 %
\$66,200 to \$94,599	25,151	41,229	16,079	164 %
\$94,600 and +	12,872	39,252	26,380	305 %
<b>Tri-Valley Total</b>	<b>176,588</b>	<b>155,258</b>	<b>(21,328)</b>	<b>88 %</b>

**Notes:**

<sup>1</sup>Maximum affordable housing cost assumed to be about 3.75 times annual income (for-sale units) or 30 percent of gross monthly income (for-rent units).

<sup>2</sup>Household incomes in 1990 \$, based in part on 1980 Census PUMS Sample A for Contra Costa County.

<sup>3</sup>Housing price distribution based on assumed relation of residential land use capacities, development densities and product types; 1990 Census data for Tri-Valley Community housing values and contract rents; and recent surveys of new for-sale and for-rent housing projects.

<sup>4</sup>Comparisons based on occupied dwelling units assuming 5% vacancy rates. Total dwelling unit capacity of Alameda County Composite City General Plans is 108,878, of which 103,436 are assumed occupied at buildout.

**Sources:** 1980 PUMS Sample A for Contra Costa County; Bay Area Council, Economic and Planning Systems, Inc.

TABLE G-5

### Tri-Valley Housing Affordability Ranges (Rental and Purchase) By Income

1990 Household Income	1990 Purchase Price <sup>1</sup>	Monthly Rent <sup>2</sup>
\$0 to \$15,099	\$0 to \$ 56,999	\$0 to \$ 377
\$15,100 to \$28,399	\$ 57,000 to \$106,999	\$ 378 to \$ 709
\$28,400 to \$47,299	\$107,000 to \$177,999	\$ 710 to \$1,182
\$47,300 to \$66,199	\$178,000 to \$248,999	\$1,183 to \$1,654
\$66,200 to \$94,599	\$249,000 to \$355,999	\$1,655 to \$2,364
\$94,600 and Over	\$356,000 and Over	\$2,365 and Up

**Notes:** <sup>1</sup>The purchase price is assumed to be based upon:

Interest Rate:	10.0%
Term of Loan (Years):	30
Percent Down Payment:	20.0%
Income Ratio Requirement:	33.0%

Purchase prices for incomes up to \$28,399 are theoretical and rental is assumed.

<sup>2</sup>Assumes that 30% of gross monthly income is spent on rent.

**Source:** Economic and Planning Systems, Inc.



TABLE G-6

**Household Income Levels for East County - 1992**

Household Income Category	1992 Household Income Range
Above Moderate	\$56,160 and above
Moderate	\$37,440 to \$56,160
Median	\$46,800
Low	\$23,400 to \$37,440
Very Low	Below \$23,400
<b>Note:</b> Above Moderate Income Range equals above 120% of the median income; Moderate equals 80% to 120% of the median income; Low equals 50% to 80% of the median income; and Very Low equals less than 50% of the median income. Figures are for Oakland Primary Metropolitan Statistical Area (includes Alameda and Contra Costa Counties for a family of four).	
<b>Source:</b> U.S. Department of Housing and Urban Development, 1992 for Oakland Primary Metropolitan	

TABLE G-7

## Tri-Valley Gateway Traffic Analysis

Tri-Valley's Share of Gateway Capacity Assuming Pass-Through Trips Remain at the 1989 Percentage<sup>1</sup>

	Future Capacity Assuming All Planned Improvements			Pass-Through Factors	Tri-Valley's Share of Gateway Capacity <sup>2</sup>		
Gateway	Vehicles (3 Hr. Period)	Workers <sup>3</sup> (3 Hr. Period)	Distribution of Highway In-commuters	Percent of Trips With Non Tri- Valley Destination	Vehicles (3 Hr. Period)	Workers (3 Hr. Period)	Distribution of Highway In-commuters
<i>From East/ Northeast</i>	16,500	20,625	20%	55%	7,400	9,250	11%
<b>I-580 Vasco</b>	12,000	15,000	14%	15%	10,200	12,750	15%
<b>Subtotal</b>	<b>28,500</b>	<b>35,625</b>	<b>34%</b>	<b>38%</b>	<b>17,600</b>	<b>22,000</b>	<b>26%</b>
<i>From North I-680</i>	16,500	20,625	20%	15%	14,000	17,500	21%
<i>From West I-580</i>	16,500	20,625	20%	15%	14,000	17,500	21%
<b>Canyon Way</b>	2,000	2,500	2%	15%	1,700	2,125	3%
<b>Crow Canyon</b>	2,000	2,500	2%	15%	1,700	2,125	3%
<b>Subtotal</b>	<b>20,500</b>	<b>25,625</b>	<b>24%</b>	<b>15%</b>	<b>17,400</b>	<b>21,750</b>	<b>27%</b>
<i>From South I-680</i>	16,500	20,625	20%	5%	15,700	19,625	24%
<b>Niles</b>	2,000	2,500	2%	5%	1,900	2,375	3%
<b>Subtotal</b>	<b>18,500</b>	<b>23,125</b>	<b>22%</b>	<b>5%</b>	<b>17,600</b>	<b>22,000</b>	<b>27%</b>
<b>Roadways</b>	84,000	105,000	100%	21%	66,600	83,250	100%
<b>Rail Transit</b>	0	9,000	#N/A	0%	0	9,000	#N/A
<b>Total</b>	<b>84,000</b>	<b>114,000</b>	<b>#N/A</b>	<b>21%</b>	<b>66,600</b>	<b>92,250</b>	<b>#N/A</b>

**Notes:** <sup>1</sup>The Tri-Valley share of gateway capacity is estimated assuming pass through-trips remain at 1989 levels. Approximately 39,000 vehicles commuted through the gateways. Approximately 39,000 vehicles commuted through the gateways in 1989. This was equivalent to approximately 48,750 workers or 46% of future gateway capacity.

<sup>2</sup>The Tri-Valley's share of capacity is equal to the future capacity minus the pass-through trips.

<sup>3</sup>Workers per vehicle is assumed to equal 1.25.

**Sources:** TJKM Transportation Consultants; Economic and Planning Systems, Inc.

**TABLE G-8**

**Comparison of Employment and Housing Capacities:  
Buildout of the "Prospective General Plans" Scenario in the Tri-Valley Subregion**

	<b>Prospective General Plans</b>
Household Capacity in the Tri-Valley <sup>1</sup>	155,255
Resident Labor Force Capacity in the Tri-Valley <sup>2</sup>	245,490
Tri-Valley Residents Employed in the Tri-Valley <sup>3</sup>	147,295
Employment Capacity in the Tri-Valley	279,225
Employees who Must Commute into the Tri-Valley	131,930
Employees who Could Commute via Rail Transit	9,000
Employees who Must Commute via Roadways	122,930

**Notes:**           <sup>1</sup>Capacity in Terms of Occupied Dwelling Units Assuming Vacancy Rate at Buildout: 5%

<sup>2</sup>Workers Per Household: 1.58

<sup>3</sup>Assumed Percentage of Tri-Valley Residents Who Work in Tri-Valley as of Buildout: 60%

**Sources:**       General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems



TABLE G-9

**Employment Potential:**  
**Buildout of the "Prospective General Plans" Scenario in the Tri-Valley Subregion**  
 Given Commutation Constraints and Likely Distribution of Future Labor Force Assuming Pass-Through Trips Remain at the 1989 Percentage<sup>d</sup>

Highway Work-Trip Capacity Available to Tri-Valley		Distribution of In-Commute Demand		Unrealized Employment and Equivalent Housing Need	
Gateway	Workers <sup>1</sup> (3 Hr. Period)	Percent of In-Commute Demand <sup>2</sup>	Number of In-Commuters Demanded <sup>3</sup>	Potential Employment Unrealized	Equivalent Housing <sup>4</sup> Needed
<i>From East/Northeast</i>					
I-580	9,250	17%	20,675	11,425	7,611
Vasco	12,750	23%	28,497	15,747	10,491
<b>Subtotal</b>	<b>22,000</b>	<b>40%</b>	<b>49,172</b>	<b>27,172</b>	<b>18,102</b>
<i>From North</i>					
I-680	17,500	20%	24,586	7,086	4,721
<i>From West</i>					
I-580	17,500	16%	19,782	2,282	1,520
Canyon Way	2,125	2%	2,402	277	185
Crow Canyon	2,125	2%	2,402	277	185
<b>Subtotal</b>	<b>21,750</b>	<b>20%</b>	<b>24,586</b>	<b>2,836</b>	<b>1,890</b>
<i>From South</i>					
I-680	19,625	18%	21,932	2,307	1,537
Niles	2,375	2%	2,654	279	186
<b>Subtotal</b>	<b>22,000</b>	<b>20%</b>	<b>24,586</b>	<b>2,586</b>	<b>1,723</b>
<b>Roadways Total</b>	<b>83,250</b>	<b>0%</b>	<b>122,930</b>	<b>39,680</b>	<b>26,436</b>

Notes: <sup>1</sup>Model assumes commutation consisting and likely distribution of future labor force of pass-through trips remain at 1989 levels. Pass-through trips are taken from Table G-7. The projected rail transit capacity of 9,000 in-commuters has been deducted from the 92,250 total capacity.

<sup>2</sup>The share of total demand assigned to East/Northeast Gateway is assumed = 40%, based on current and projected housing costs in Central Valley and Pittsburg/Antioch/Brentwood areas.

<sup>3</sup>From Table G-7. The projected rail transit capacity of 9,000 in-commuters has been deducted from the 131,930 total demand.

<sup>4</sup>Additional occupied housing unit demand, assuming 1.58 workers per occupied dwelling. Assuming 5% vacancy rate, the equivalent total dwelling unit demand is approximately 27,827 du.

Sources: Economic and Planning Systems, Inc.



## APPENDIX 5

### List of Acronyms and Abbreviations

ABAG	Association of Bay Area Governments
ACFP	Alameda County Fire Patrol
ACFCWCD	Alameda County Flood Control and Water Conservation District
ACSMO	Alameda County Surface Mining Ordinance
ACTAC	Alameda County Technical Advisory Committee
ACTA	Alameda County Transportation Authority
ACWMA	Alameda County Waste Management Authority
ACWD	Alameda County Water District
ADNL	Annual Day-Night Noise Level
ADT	Average Daily Traffic
ADTs	Average Daily Trips
af/yr	acre-feet of water per year
af	acre-feet
AFY	acre-feet per year
ALUC	Alameda County Airport Land Use Commission
APA	Airport Protection Area
AWRP	Advanced Water Reclamation Plant
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
BBID	Byron-Bethany Irrigation District
BMP	Best Management Practices
Camp Parks	U.S. Army Parks Reserve Forces Training Area
CCAA	California Clean Air Act
CCCSD	Central Contra Costa Sanitary District
CDF	California Department of Forestry
CDMG	California Division of Mines and Geology
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CHP	California Highway Patrol
CIP	Capital Improvement Program
CMAAs	Congestion Management Agencies
CMP	Congestion Management Program
CFD	Community Facilities District
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon Monoxide
Corps	U.S. Army Corps of Engineers



County	Alameda County
CRS	Community Rating System
CSA	County Service Area
CTC	California Transportation Council
CWA	Clean Water Act, 1972
dB	decibel
dBA	A-weighted dB scale
DFG	California Department of Fish and Game
DHS	Department of Health Services
DOD	Department of Defense
DRFA	Dougherty Regional Fire Authority
DSRSD	Dublin San Ramon Services District
du/ga	dwelling units per gross acre
du/na	dwelling units per net acre
DUSD	Dublin Unified School District
DWR	California Department of Water Resources
EDAB	Alameda County Economic Development Advisory Board
EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Park District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPS	Economic and Planning Systems, Inc.
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
GPA	General Plan Amendment
GPD	Gallons Per Day
G.O.	General Obligation
HEAF	High Explosives Application Facility
ISO	Insurance Services Office
LAFCO	Local Agency Formation Commission
LARPD	Livermore Area Recreation and Park District
LAVTA	Livermore-Amador Valley Transit Authority
LAVWMA	Livermore-Amador Valley Water Management Agency
Ldn	Day-night equivalent sound level
LLNL	Lawrence Livermore National Laboratory
LOS	Level of Service
LRT	Light Rail Transit
LVJUSD	Livermore Valley Joint Unified School District

MAP	Mean Annual Precipitation
MGD-ADWF	Million gallons per day-average dry weather flow
MGD-AWWF	Million gallons per day-average daily wet weather flow
mg/l	Milligram per liter
MHSD	Mountain House Elementary School District
MTC	Metropolitan Transportation Commission
NFIP	National Flood Insurance Program
NPDES	National Pollution Discharge Elimination System
PDR	Purchase of Development Rights
PGE	Pacific Gas & Electric
PM-10	Particulate Matter, 10 micron
PPM	Parts Per Million
psi	Pounds per Square Inch
PSTIP	Proposed State Transportation Improvement Program
PUSD	Pleasanton Unified School District
RO	Reverse Osmosis
RTIP	Regional Transportation Improvement Plan
RWQCB	Regional Water Quality Control Board
SACAR	Southern Alameda County Association of Realtors
SBA	South Bay Aqueduct
SCS	Soil Conservation Service
SEIR	Subsequent Environmental Impact Report
SFWD	San Francisco Water Department
SGSD	Sunol Glen School District
SHAMA	Seismic Hazards Mapping Act
SLVAP	South Livermore Valley Area Plan
SMARA	State Mining and Reclamation Act
SNLL	Sandia National Laboratories, Livermore
SOV	Single Occupant Vehicle
SMP	Surface Mining Permit
SOI	Sphere of Influence
SPRR	Southern Pacific Rail Road
SRVFPD	San Ramon Valley Fire Protection District
SRVUSD	San Ramon Valley Unified School District
S RTP	Short Range Transportation Plan
STIP	State Transportation Improvement Plan
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TAC	Toxic Air Contaminants
TAZ	Traffic Analysis Zone
TCM	Transportation Control Measures

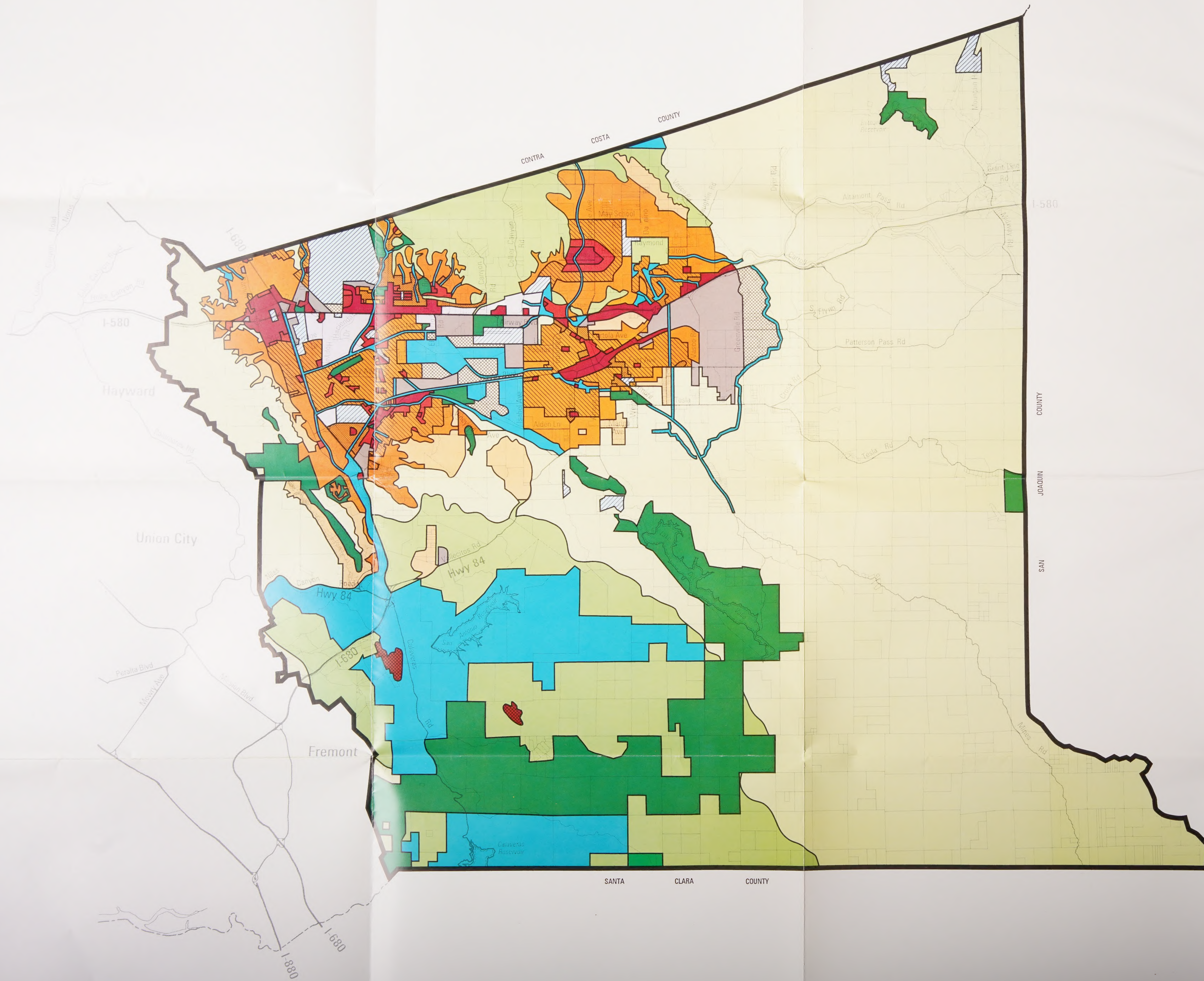
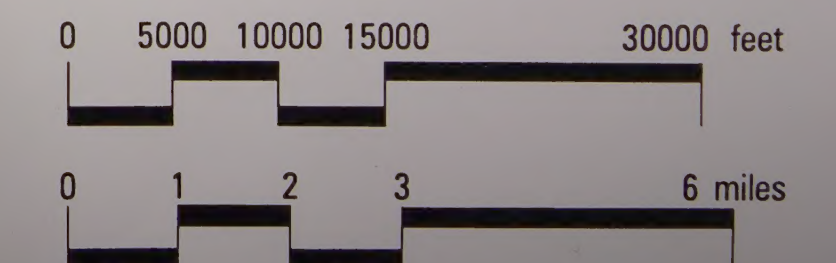
TDR	Transfer of Development Rights
TDS	Total Dissolved Solid
TIP	Transportation Improvement Plan
TOD	Transit Oriented Development
TPD	Tons of Solid Waste Per Day
TSM	Transportation Systems Management
TVC	Tri-Valley Council
TWA	Tri-Valley Wastewater Authority
ug/m3	Micrograms per Cubic Meter
UPRR	Union Pacific Railroad
USDA	U.S. Department of Agriculture
USF&WS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VAC	Visual Absorption Capability
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
V/C	Volume to Capacity
WMP	Wastewater Management Plan
ZONE 7	Zone 7 of the Alameda County Flood Control and Water Conservation District



# Land Use Diagram

## LEGEND

-  Rural Residential
-  Low Density Residential
-  Medium Density Residential
-  Medium High Density Residential
-  High Density Residential
-  Very High Density Residential
-  Commercial
-  Industrial
-  Mixed Use / Business Park
-  Quarries
-  Major Public
-  Urban Reserve
-  Major Parks
-  Water Management
-  Resource Management
-  Large Parcel Agriculture





TDR  
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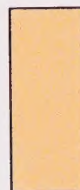
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## LEGEND

Rural Residential



Low Density Residential



Medium Density Residential



Medium High Density Residential



High Density Residential





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